

Radio Control CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

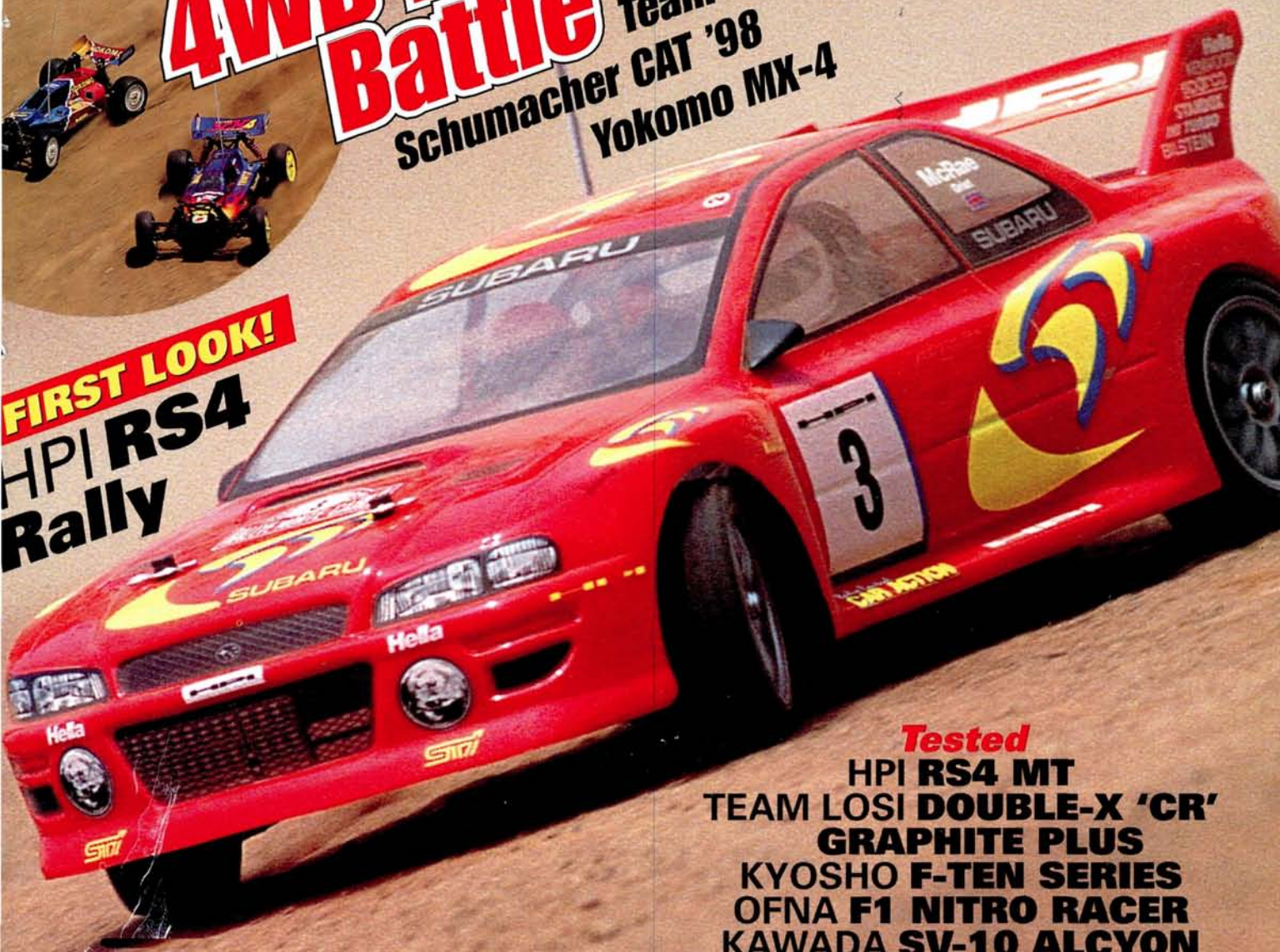
HOT HOMEBUILT!
4-STROKE
KYOSHO USA-1

October 1998

**4WD Buggy
Battle**

Team Losi XX-4
Schumacher CAT '98
Yokomo MX-4

FIRST LOOK!
HPI RS4
Rally



Tested
HPI RS4 MT
TEAM LOSI DOUBLE-X 'CR'
GRAPHITE PLUS
KYOSHO F-TEN SERIES
OFNA F1 NITRO RACER
KAWADA SV-10 ALCYON



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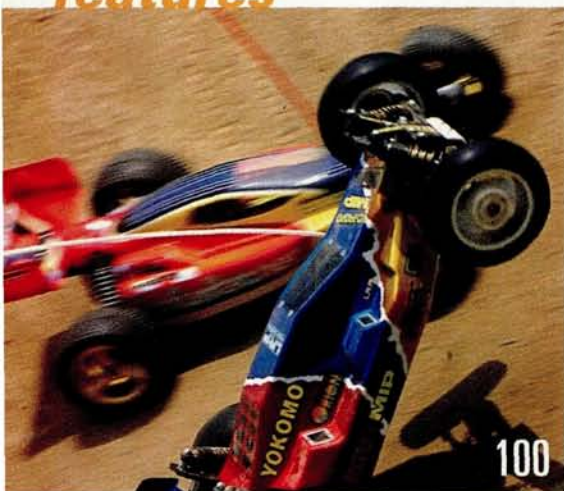
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BY PETER VIEIRA

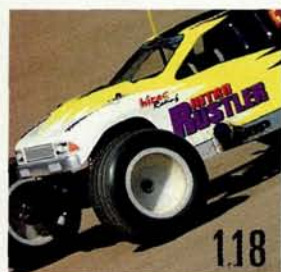
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BY STAFF OF R/C CAR ACTION

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ON THE COVER: (top to bottom): Homebuilt 4-stroke Kyosho USA-1; HPI's RS4 Rally gets crossed up; the Schumacher CAT '98, Yokomo MX-4, and Team Losi XX-4 prepare to do battle; Futaba's Magnum 3PJ; Project Traxxas Nitro Rustler puttin' down the ponies. (All photos by Walter Sidas.)

Is 4WD in your future?

As I shake up my Magic 8 Ball to answer that burning question, I'm getting "My sources say yes" every time. Heck, how could there *not* be a 4WD car in your future when the hobby biz is enjoying the widest proliferation of all-wheel-drivers ever? It's not hard to see why these vehicles are so popular. 4WD machines are easy to drive, out-handle 2WD vehicles and can—in off-road trim—go virtually anywhere. Case in point: the **HPI RS4 MT**, Thrash Tested in this issue, and the **HPI RS4 Rally**, which gets the First Look treatment.



Kyosho also realizes the benefits of all-wheel-drive and makes excellent use of the system in its **Kyosho F-Ten** series cars, reviewed in this issue. While the F-Ten chassis is offered with World Sports Car and Formula 1-type bodies, the full-scale versions of which are traditionally 2WD machines, the F-Tens are spared the potentially tricky handling of these types of vehicles because Kyosho specifies 4WD. Sure, the all-wheel-drive might not be scale, but so what? R/C is always more fun when the car is easy to drive.

We can't talk about 4WD without discussing 4WD racing. This class received renewed attention when "newcomer" Team Losi released the XX-4, a clean-sheet-of-paper design. We put the new guy up against long-time class-leaders Yokomo and Schumacher in the **Electric Racing 4WD Buggy Guide**, a must-read if you want to go 4WD buggy racing. Let us know which you think is top dog when you've finished the article—we're listening.



Of course, there's more to this issue than all-wheel-drivers; we've packed in a whole bunch of great stuff this time out. Master your computer radio with our **Futaba Magnum 3PJ User Guide**. Get inspired with a

new kind of nitro-monster-mayhem with our **Homebuilt Project: 4-Stroke USA-1**. And last, if you're among the legions of Traxxas Rustler owners, you'll want to proceed directly to our **Project Traxxas Rustlers**. Nitro or electric, these well-massaged machines will get your blood pumpin' for sure. Enjoy.



Peter Vieira
Peter Vieira
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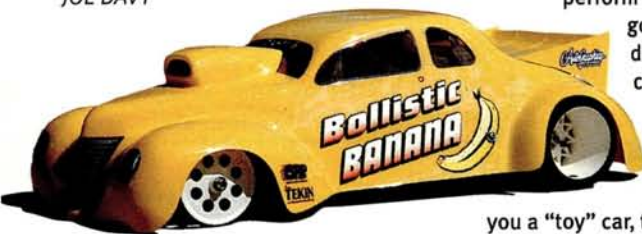
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Rules of the Game

Good job on that Drag Racing 101 article (July 1998); it got me interested! However, I would have liked to have seen the rules for IEDA competition, or at least an address where we could get them. I really liked the story, but it left me wondering about the rules of the game. Thanks. [email] JOE DAVY



Thanks for the advice, Joe. We appreciate all the praise we get from readers, but constructive criticism helps us give everyone a better mag! You can reach the International Electric Drag Racing Association (IEDA) at (910) 592-9489. You should also check out Race America's website at www.raceamerica.com for all kinds of drag info and links, and stay tuned to *RCCA* for more drag-racing features. —Pete

Toy Boy

I've been wanting for so long to get into R/C, and now I finally have a chance to get a car, but my parents are getting mixed up with the difference between those cheesy toy R/C cars and the high-quality ones like Tamiya or Traxxas kits. Can you write me a little something so I can show my parents that high-quality cars last for a long time if taken care of and maintained? I'd really like to get a Tamiya Stadium Thunder but they think as soon as I get it, I'll totally bust it, even though I'll just be using it in a parking lot! Also, what is the life span of an R/C car on average? Thanks; *Radio Control Car Action* kicks butt! [email] DAVID E. SCHNABEL

Basically, hobby-type R/C cars last forever because you can replace all their parts as they wear out. Yes, they are more expensive than "toy" R/C cars, but you get much more fun for your dollar. First, there's the pleasure and sense of pride you get

from building your own car. I can't truly express how cool it is to build something yourself and then see it run; you have to experience it. Second, there's the fun of hopping-up and tuning your car for more performance. You'll learn about mechanics and physics in the process—without even trying! Third, hobby-type R/C cars simply perform better. They

go faster, handle more precisely and are just plain more fun. If your parents get you a "toy" car, they'll be buying you a few hours' worth of so-so fun, then you'll probably get bored and put the car away. If they get you a hobby-quality car, they'll be opening the door to a fulfilling, educational hobby—one that has given me years of enjoyment.

If you just can't convince your folks to go with a "real" R/C car, ask them to chip in the money they would have spent at the toy store, then earn the rest of the dough yourself. I'll bet everybody in your neighborhood has something they would rather pay you \$5, \$10, or \$20 to do rather than do themselves. I used to scout around my neighborhood looking for stuff I could do. If my neighbor's grass was getting high, I would offer to cut it. If I saw a lot of weeds in someone's bushes, I would offer to pull 'em. Cars need washing, dogs need walking, papers need delivering, fences need painting. If you work hard, you can wake up broke at 9 a.m. and go home with \$50 to \$100 in your pocket by the time dinner is ready.

Good luck, Dave. Let me know how it goes! —Pete

Dizzy Speaks

This is in response to "NO NAME," who trashed our sport (Readers Write, September '98). I would like to say that everybody does his own thing, and R/C must not be your thing! Ever since I was 7 or 8, I wanted an R/C car, but my dad said, "That's too much money, go to Wal-Mart!" Well, now I have two cars, one gas and one electric!

Although I haven't run my RC 10GT yet—due to my inexperience with nitro cars—the guys at the track are going to help. My point is this: there are a lot of good things about this hobby/sport: you buy it, build it and learn a lot about cars in the process. I have hopes of owning my own hobby shop/racetrack—after all, R/C is all I want to do! Please try not to be so negative about the cost of R/C; it's worth spending a little to enjoy a cool hobby and have cool friends who share your interests. Remember: money is the root of all evil, so spend it now on R/C stuff, 'cuz when you're dead, the only money you'll see is a canceled check! [email] DIZZY

Too Hot to Handle

I own an HPI RS4 MT. Whenever I drive the truck, the battery packs get extremely HOT! It takes about 30 minutes for them to cool off. The same battery on my Stampede just gets warm. I thought it was the battery so I got a new one; the same thing happened. Then I thought it could be that the RS4 MT's inner body was not allowing cool air in and hot air out, so I ran it without the body—the same thing happened. I could use some help. I have a Dynamite 1500 battery and a Speed Gems 17 single motor. Thank you! [via Internet] CAMERON WYATT

What you're experiencing could be completely normal. The high discharge rates that are common in R/C applications tend to make the batteries warm when they're used; the higher the discharge rate, the warmer the battery will get. A mild modified motor drains a battery more quickly than a stock or original equipment Mabuchi motor. The 17-turn motor in your MT will draw more power from the battery than the motor that is included in the Stampede, and this causes it to heat up more. You should also consider that the MT's 4WD system requires more energy to operate than the Stampede's 2WD system, and that also causes the battery to work harder.

Other contributing factors could be using a pinion gear that

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Peter Vieira: peter@airage.com
Greg Vogel: greg@airage.com

is too big (too many teeth), or running the truck on surfaces that cause it to strain (such as tall grass). —Steve

Clutch Player

I recently bought an RC10GT. I had trouble starting it at first, then I took it to a hobby shop and had it tuned and they said it ran fine. So I took it home and started it but, after about 30 seconds, I took off the Ni-starter and the engine stalled. I played with it and finally got it started again. I took off the Ni-starter and it still ran but, when I hit the gas, I heard the engine rev, but it didn't move and then it stalled. I spoke to my dad about it, and he said I should tighten the slipper clutch. So I tightened it and then it moved, but then stalled again. Should I get a better glow plug? Different fuel? Please help! [via Internet] JOHN SCHERMERHORN

John, it sounds as if your truck is close to running fine, I just think you're jumping the gun a little bit. Properly tuned nitro engines don't run very well at idle until they've had a chance to warm up. When you get the engine started, leave the glow-plug igniter attached for about 30 seconds. Carefully rev up the engine a few times, and then remove the glow-plug igniter. While holding the truck in the air (or with it sitting on the starter box), let it run for another 30 seconds, occasionally tapping the throttle to keep the engine "cleaned out." Assuming the fuel-mixture screws are close to being properly adjusted, as your local hobby shop indicated, the engine should run fine.

It wouldn't hurt to have a spare glow plug close by, just in case this is what is causing your problem. Good luck! —Steve

BREAKING NEWS

IFMAR WORLDS
UPDATE

England's David Spashett, driving for Team Trinity, scored a hat trick by sweeping every class at the 1998 IFMAR 1/10- and 1/12-scale World Championships.

Spashett won 2 of the 3 Mains in 1/12 with his Trinity Revolver 22J, then followed up by winning 11 of the 13 rounds in the touring-car exhibition race with his Trinity-powered Team Losi Street Weapon. The icing on the cake was Spashett's sweep of all three 1/10 Mains with his Trinity Switchblade 10.

Congratulations to Spashett and Trinity, and to Team Losi for capturing the Manufacturer's Cup and for its performance in the touring-car class!

1/12 SCALE

TOURING
CAR

1/10 SCALE

	DRIVER	CAR	MOTOR	BATTERIES
1	David Spashett	Trinity Revolver 22J	Trinity 13X3	Trinity VIS 2000
2	John Orr	Associated 12L3	GM 14X4	GM 2000
3	Masami Hirotsuka	Associated 12L3	Reedy 16X3	Yokomo 2000
1	David Spashett	Losi Street Weapon	Trinity 12X4	Trinity VIS 2000
2	Josh Cyril	Losi Street Weapon	Trinity 12X3	Trinity VIS 2000
3	Joel Johnson	Losi Street Weapon	Trinity 12X3	Trinity VIS 2000
1	David Spashett	Trinity Switchblade 10	Trinity 12X2	Trinity VIS 2000
2	Joel Johnson	Trinity Switchblade 10	Trinity 12X4	Trinity VIS 2000
3	John Orr	Associated 10L2	GM 11X3	GM 2000

TEAM LOSI GOES
GAMING ON PC
AND PLAYSTATION

If your local track is of the outdoor variety, then rain must keep you off the dirt now and then. No more!

Now you can hit the track (virtually, anyway) whenever you want to, just by booting up your PC or Sony

Playstation. With the help of Team Losi, Fox Interactive is taking R/C into the gaming world with "Team Losi R/C Racer." The game features 15 tracks of varying terrain, 16 unique cars (each with different driving characteristics and features), "360° rollover action," split-screen/two-player mode, and drive-

through "gates" that activate powerups and enhancements—uh, just like at your local track, right? From the screenshots we've seen, it looks as if "Team Losi R/C Racer" will be a blast. Look for a national roll-out right about ... now!

DECIMATE
'EM WITH A
DECIMAL POINT!

BY CHRIS CHIANELLI

Trinity has just released a new modified: the D3.5. This hand-wound, modified

motor features a new, more efficient motor can. The D3.5 motor

can was designed with more material on the

mounting plate end for less magnetic flux loss.

Trinity tells us this results in a stronger,

longer-lasting magnetic field. The new

motor can also helps prevent loss of magnetic

strength. To further

maintain magnetic strength, 6.2V NP wet-

pressed magnets are used for more resistance to

losses caused by the armature.

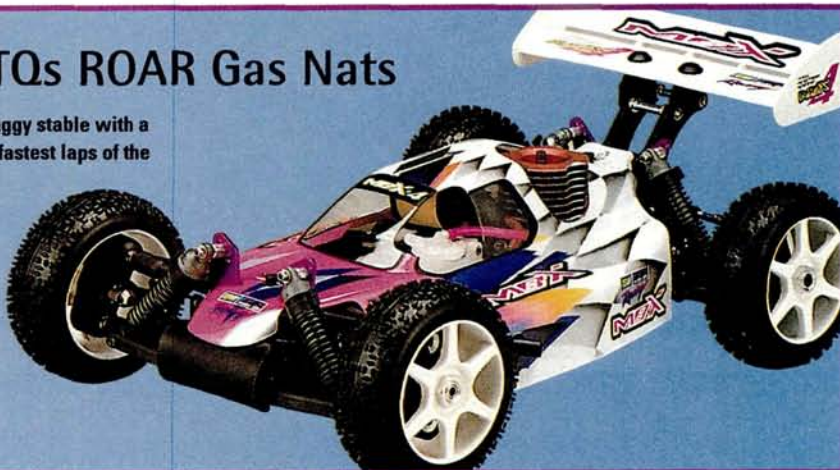
The new "monster circular mill" (MCM) armatures featured in the D3.5 are hemi-pattern-wound for higher consistency and more rpm. Hemi winding gives the equivalent of 1/2 turn less wire. For less resistance, all of the comm tabs have been welded with a brazing rod that has a higher-than-normal silver content. New, heavy-duty epoxy ensures that centrifugal force cannot cause wires to shift during running, which may cause the armature to lose its delicate balance. A polarized brush system uses different compound brushes for the positive and negative; this produces maximum horsepower while providing long commutator life.

Pricing and part numbers aren't available yet; stay tuned for more info!



All New Mugen MBX-4 TQs ROAR Gas Nats

Mugen debuted the latest addition to its winning 1/8-scale buggy stable with a splash at the ROAR Gas Nats, where Richard Saxton cut the fastest laps of the highly talented field. The MBX-4 is not a revamped Super Athlete but an entirely new vehicle with some innovative features. Most notable are the deeply angled front and rear inner hinge pins. They look like they would yield about 40° of toe angle with conventional suspension arms, but the MBX-4's arms are designed to work with the radical layout (obviously). Check out Steve Pond's coverage of the Gas Nats elsewhere in this issue for a "body off" look at the car, and expect a Thrash Test soon!



Two new machines from Associated

You-name-it "touring" car!

Now, now, I didn't say this is the Associated touring car; that top-secret machine is still locked up tighter than the Aurora project. This is something completely different. The pan-car-derived chassis shown here accepts all the standard 190mm touring- and GT1-type bodies available and would be raced as part of a stand-alone class. The class would retain the scale flavor of touring cars but would be much easier on carpet courses, thanks to the use of standard pan-car foam tires.

Associated hasn't green-lighted the project yet; if you like the idea, give 'em a call and tell them what you think!

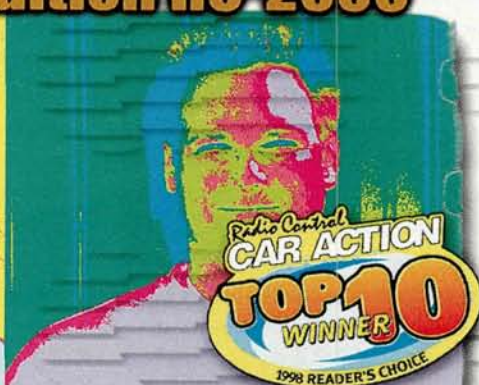
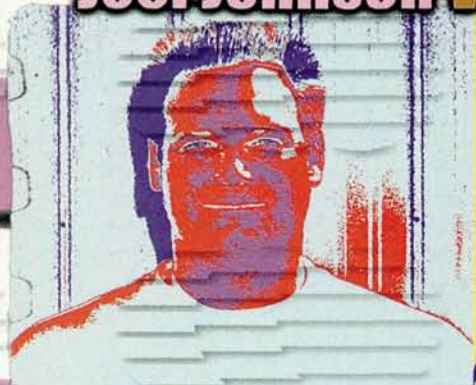


Low-Buck Dual Sport

Don't let a deficiency of dollars keep you from hitting the pavement, Dual Sport-style; Associated has just released its new RC10DS Qualifier, a budget-friendly version of its highly capable 2WD street machine. Associated didn't skimp on the good stuff; you still get an aluminum tub chassis, 23-turn motor, resistor speed control, oil-damped shocks, front and rear sway bars and fully adjustable suspension. Premounted foam tires replace the rubber units found on the Sport and Team kits, and the Qualifier can be had with a Ford NASTruck or Camaro Trans-Am body.



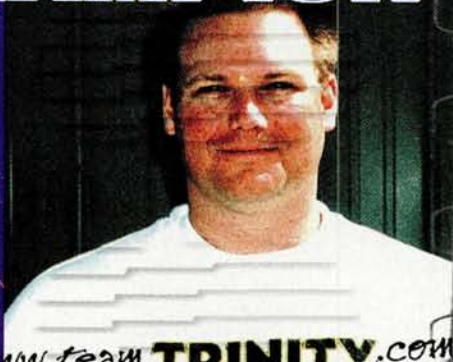
Joel Johnson VIS EX-TRA Team Edition RC-2000



'98 ROAR INDOOR TOURING CAR NATIONAL CHAMPION

Joel Also Used:

TK3001, \$17.99	Steering Ball Bearings
TK3009, \$8.99	Blue Anodized Rear Suspension Brace
TK3012, \$19.99	Blue Anodized Motor Mount Clamp
TK3025, \$12.99	Blue Anodized Servo Mount
TK3028, \$23.99	Blue Monster Motor Heat Sink
TK3033, \$5.99	Foam Bumper
TK3040, \$10.99	64 Pitch Gear Adapter
TK3037, \$3.99	Purple Congo Shock Springs, (.065)
RC7100, \$3.50	100 Weight Trinity Silicone Shock Oil
RC6073, \$8.99	Touring Car Tire Tamer



www.teamTRINITY.com

Dirtinator 3 Modified Street Weapon Trinity

Xipp Up Your Car

Here are some hot goodies from Xipp's (say "zip's") new Option 1 line of high-performance accessories. First, we have the trick Uni Belt Tensioner, which fits all



types of belted cars. The pinch block allows the tension roller to be adjusted in and out for precise alignment, and belt tension is infinitely



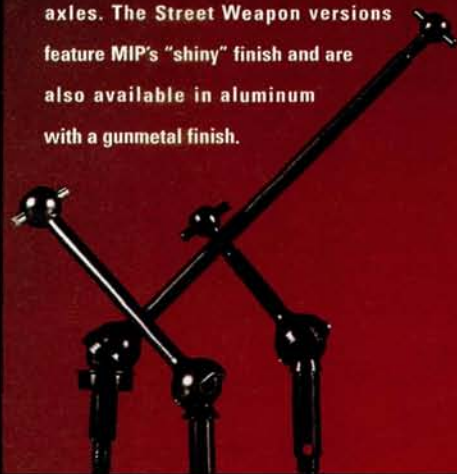
adjustable. You nitro guys are probably already salivating over the finned Option 1 engine mounts and the Option 1 Pro Touring Head. Hey, so am I! The Pro Head offers a lower CG than the taller heads usually seen on race motors; it also increases cooling efficiency and delivers a slightly higher compression ratio. The Pro Touring Head is currently available for the O.S. CV only, but versions for other



powerplants are on the way. All Option 1 parts are available in blue only and are made in the good ole USA.

CVDs FOR STREET WEAPON & RS4 MT

When it comes to high-performance axles, MIP's CVDs are just about everybody's first choice. Now HPI's RS4 MT and Team Losi's Street Weapon can benefit from the exceptional smoothness, durability and all-important rebuildability of these top-rated axles. The Street Weapon versions feature MIP's "shiny" finish and are also available in aluminum with a gunmetal finish.



MONSTER STOCK JB4 Pro

36" Stock, 27 Turns, 22 Awg.
6.0 Wet Magnets, LCG™ Flat Motor Can
RC4499 "E" Brushes, Tweaked Springs
Dyno Tuned, Capacitor Installed
In Motor Tube With Dyno Print Out
Very Fast.....And Very Scary!

RC2103



SPEED COUNTS

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MEETS ALL
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NORRCA



Hit The Track In Top (Proto)Form

The latest addition to Protoform's line of high-performance touring-car bodies is the '98 Ford Mondeo (or Contour, as it's known in the States), one of the most successful racers on the British Touring Car Championship circuit. Scale buffs and concours judges will appreciate the new shell's lines and styling, while racers will appreciate the precise handling characteristics the Mondeo provides. The body is 190mm wide to fit all the popular touring-car chassis and meets all ROAR, NORRCA and IFMAR specs. The body also includes window masks, decals and an add-on wing, with all the necessary hardware.

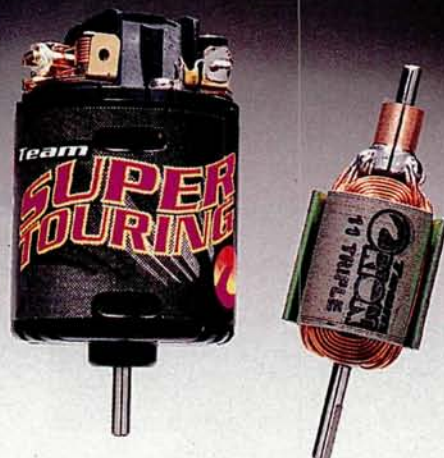


Pro-Line goes for

... three mounting holes, that is. Pro-Line's new Aeroforce wheels for 1/12 scale feature the same three-hole pattern used by Yokomo and Associated's new RC12L3, a pattern that's rapidly becoming the standard for 1/12 rear wheels. The new hoops are more aerodynamic, thanks to a subtly

3 dished face, and I'm told they were used by David Spashett and John Orr to take first and second, respectively, at the 1998 Worlds, even as I type this. The new design is popped out of a special mold that results in a super-true wheel, and they're about a gram lighter than previous Pro-Line/Jaco wheels. Everything counts!

TEAM ORION MODS JUST FOR TOURERS



Power-hungry touring-car racers have potent new powerplant options in Orion's new Super Touring hand-wound mods. Like all Orion hand-wounds, the new touring mills feature "pattern-wound" armatures that offer a more precise "dynamic" balance (meaning less weight is required for final balancing), and the arms are also "magnetically balanced," in that the identical winding patterns on each of the arm's webs create an equal magnetic field for each web, according to Team Orion. If it works as good as it looks, it should be hot! Additional features include new serrated brushes and a "zero gravity" process that coats the armature laminations with epoxy without creating a heavy spot.



NEWS FLASH

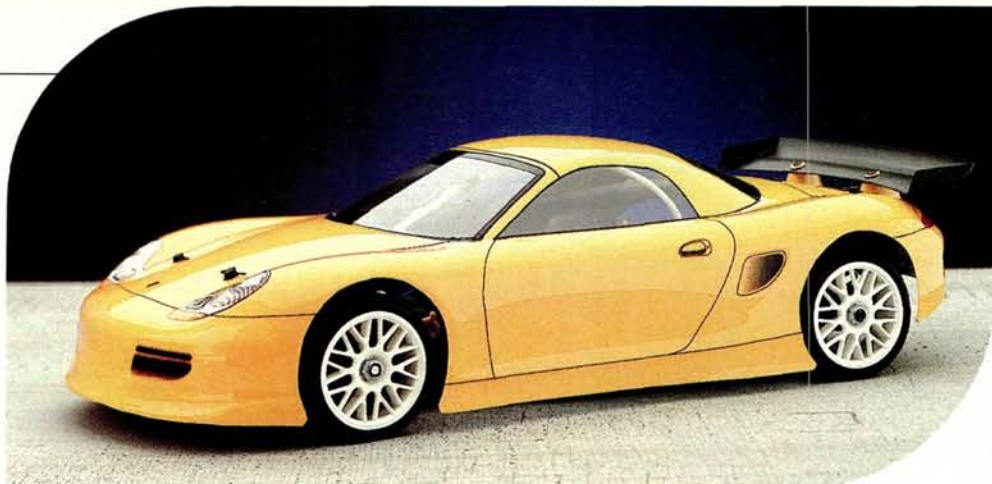
TRAXXAS SOON TO RELEASE RTR NITRO TOURER! Hot on the heels of the electric 4-Tec comes an all-new (and as yet unnamed) nitro sedan from Traxxas. We've been promised that this new, ready-to-run, belt-driven, 4WD machine will top 50mph out of the box, thanks to the standard Traxxas Pro .15 engine with tuned pipe and 2-speed transmission. Other features will include a blue-anodized, aluminum chassis, center-mounted fuel tank for a low center of gravity and, possibly, a new swaybar system. Traxxas hasn't finalized the body and wheel choices yet, but they say the prototype car has nudged the legal speed limit as clocked by police radar. We'll put it to the test ASAP!

BENNETT TO RELEASE ALUMINUM CHASSIS FOR KYOSHO USA-1

Bennett Equipment will soon release an aluminum aftermarket chassis for hop-up-hungry USA-1 owners. According to Larry Bennett, the new chassis will feature a solid rear axle, an entirely new, no-bellcrank steering system and more than 6 inches of travel. Our test sample is on the way!



"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the eighth annual "Readers' Rides of the Year Contest" in the fall of 1998. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



Details ... details

Jeff Schotland of North Kansas City, MO, has two beautifully detailed cars with tons of hop-ups. His Losi Street Weapon wears a Protoform Boxster body and features GM Racing wheels, HPI tires, Litespeed motor, aluminum motor clamp, heat-sink rear-suspension mount and aluminum servo mount by Trinity. Jeff uses a Futaba 3PDF radio, Tekin ESC, Hitec servo and a Reedy battery. The other Boxster is a Tamiya kit equipped with Hitec radio, Trinity motor, Novak Explorer ESC and taillights.

Jammin' in St. Louis

Tom Anselman of St. Louis, MO, says his Nitro RS4 really "jams." It's equipped with a Traxxas TRX .15 engine, HPI header and pipe and a 2-speed tranny. Pro-Line tires keep it firmly planted, and Futaba radio gear keeps it all under control. A BMW M3 body—painted by Tom's cousin, "Easy Ed"—tops the car.



Hummin' along

This military setup belongs to Hameed Satar of Hollis, NY. Hameed painted both kits and controls the Tamiya Hummer with a Futaba Magnum PCM radio, an MC210CB speed control and a Sanyo 1700mAh battery. It has a full set of bearings, and the Tamiya King Tiger tank is commanded by a Futaba Conquest radio and an MC310CB ESC. Ten-hut!

Concours creations

These two stunning Corally 1/12 cars—an SP12G3 and a SP12G2—were brought to our attention by Boyd Chwartacki of Winnipeg, Manitoba, Canada. They're equipped with Tekin G9 speedos and Corally motors, and a JR R756 transmitter handles the controls. The bodies were both painted by Boyd's friend Jeff Johnson; the darker one with orange striping placed third in concours at the 1997 Indoor Championships in Cleveland.



A car blooms in Brooklyn

Using dusty rose, metallic dark green and metallic platinum paint, Wayne Gregory of Brooklyn, NY, spent a lot of time painting his Tamiya Isuzu MU and Honda CRV. See how the dusty rose fades into the black? They both feature a full set of ball bearings, an optional stock motor and a Futaba Magnum Sport radio system. Great job on the paintwork, Wayne.



Down Under diversity

Here's a lineup from Down Under—Queensland, Australia, to be exact. Jason Willcox runs a funny car, Team Associated's RC10T3, RC10, RC10T, RC10LS, and RC10LSO and a Kyosho unlimited hydroplane race boat. Futaba radio gear and Sanyo batteries keep them all running, and thanks to a bit of hook-and-loop tape, Jason is able to swap a pair of Novak ESCs between them. He also painted the bodies himself.



South American Serpent

Flavio Loures Salinet from Curitiba, Brazil, holds the local track record for 1/10 scale with this Serpent Impact M2. It uses a Futaba 3PDF radio, a Mega SX-15 EV2 engine with heat-sink head and Ellegi tires. Flavio races with a Porsche 962 GTP body.



One of a kind!

All the way from Frankfurt am Main, Germany, comes Erwin Kruse's

homebuilt FWD

RS2—or at least

that's what he

calls it. Erwin took a

box of spare HPI RS4 parts

and went to work, eventually arriving

at what you see here. He took some heat from the other drivers at his local track when they thought he had put the car on the track backwards, but they didn't have much to say when it zipped around the track. Erwin says he had a few minor problems, but he has worked them out and now has a great racecar. Anyone at HPI watching?

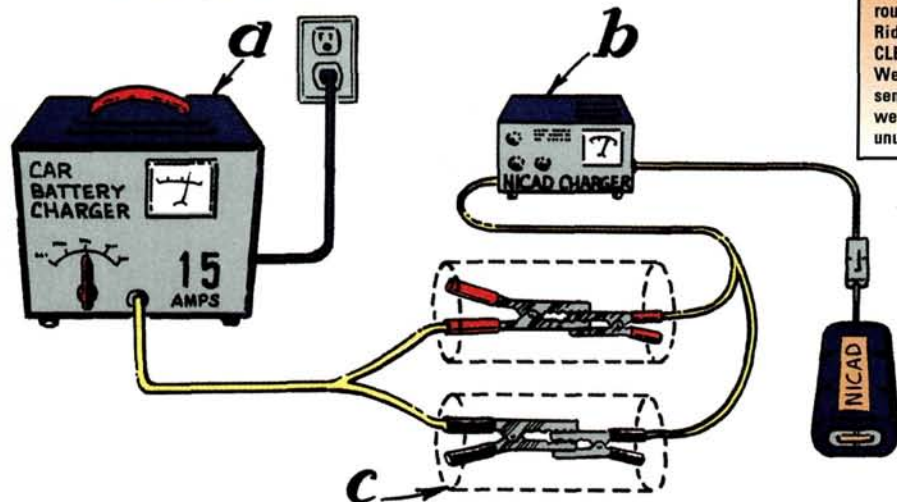


PIT

workshop ideas & innovations

BY JIM
NEWMAN

tips



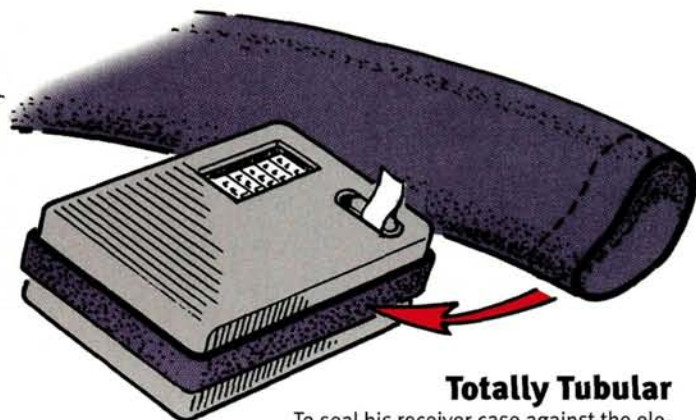
HIGH PERFORMANCE RACING PRODUCTS

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.

Take Charge

Not wishing to deplete the battery of his folks' car, Brad used an automobile charger (a) to power his Ni-Cd pack charger (b) while he worked at the bench. We suggest that you cut the ends off thick plastic bags, then slip them over the clips (c) so there is no danger of shorting them together. Be sure to connect red clip to red clip, and do NOT switch the charger to BOOST.

BRADLEY MERENDIN, Beaconsfield, W. Australia



Totally Tubular

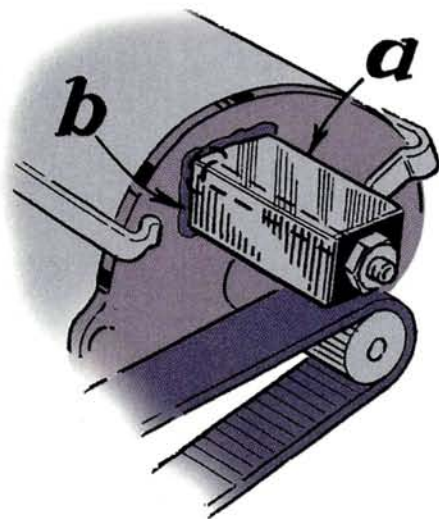
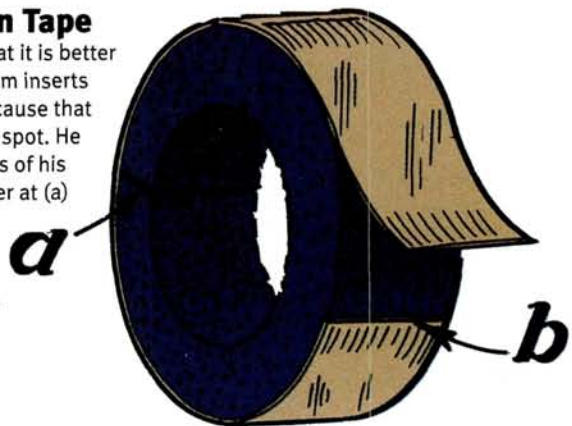
To seal his receiver case against the elements, Mike cut bands from an old inner tube and stretched them around the case seam. Wrapping the case in a small plastic bag would also help.

MIKE BOYKIN, Hamilton, OH

Caught on Tape

Ki suggests that it is better not to glue foam inserts end to end because that creates a hard spot. He brings the ends of his inserts together at (a) then wraps them with plastic parcel-strapping tape at (b).

KI CHOE,
Irvine, CA



Cool RS4, Man!

An easy and inexpensive method of cooling the motor-mount plate on an RS4 MT is to attach a heat sink (a) to the plate with a long screw and nut. To help transfer the heat into the sink, smear RadioShack heat-sink grease (b)—no. 276-1372—to the end of the heat sink and to the hardware.

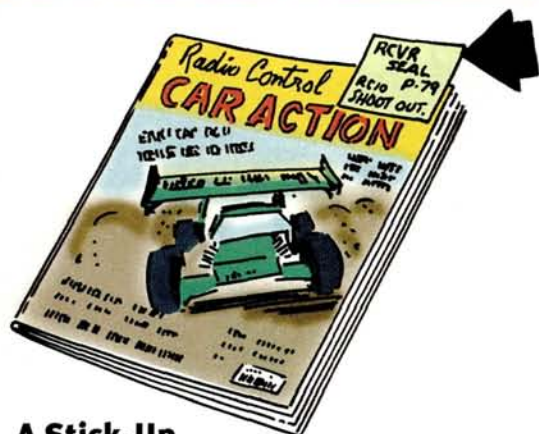
JUSTIN HYSLOP,
Selkirk, NY

Tacky Protectors

Place a large metal washer on a strip of adhesive parcel tape, then cut around it to make protectors that fit around the body-mounting posts. Now the body clips will not scratch the paintwork.

EDUARDO SANTIBANEZ NAVARRO,
Torreon, Coahuila, Mexico





A Stick-Up

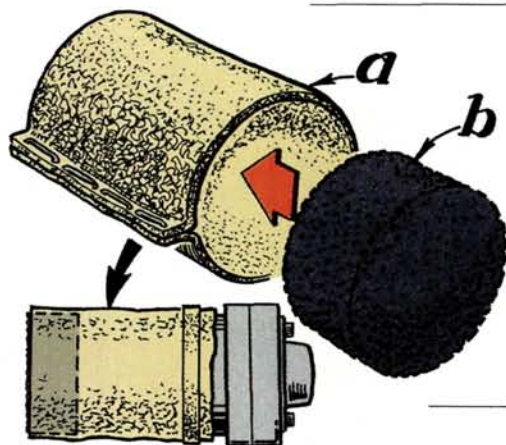
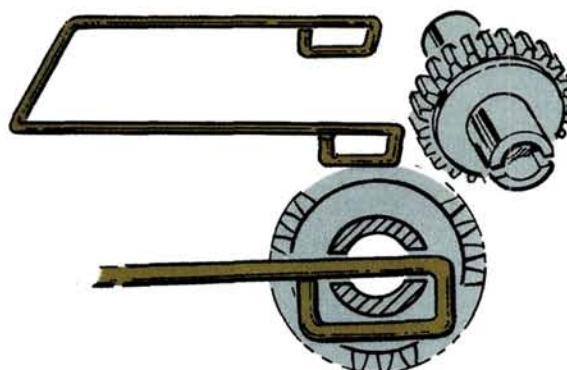
Write the titles of your favorite articles and "Pit Tips" on Post-it notes, then stick them on the covers of your copies of *RCCA* for ready reference in the future. Saves flipping through all those pages when you need to find that certain "Thrash Test" or product guide.

TAUREAN BENNETT, New Rochelle, NY

Diff Locker

Use coat-hanger wire to make this simple diff-locking tool to use when making adjustments to the clutch. Slip it into the dogbone slots, then hold the handle as you adjust.

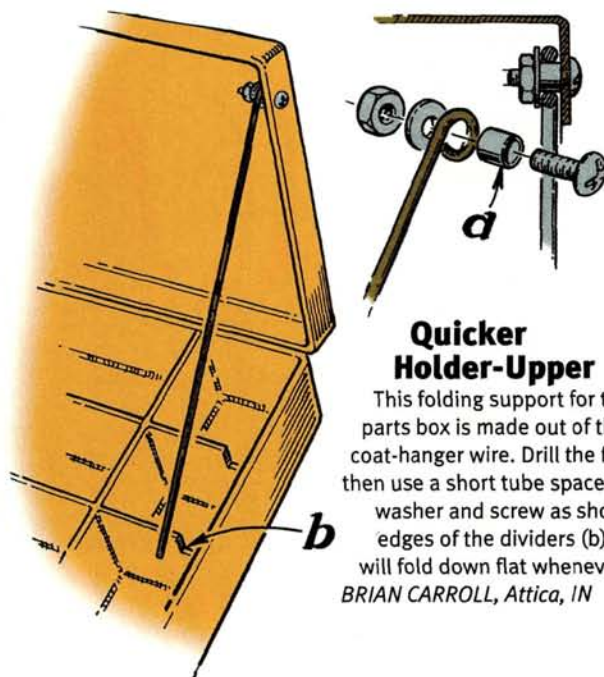
TEDDY WOODS, Tallassee, TN



Filter Cooler

Staple together this tube made of artificial chamois material from the auto parts department (a), then glue a lawn mower filter (b) into the end with a flexible glue. Before running your car, saturate the chamois with water, slip the whole thing over your motor, then rubber band it in place. Not only will it filter out the dirt that would go into your motor, but as the water evaporates, it will also draw heat away from the motor case.

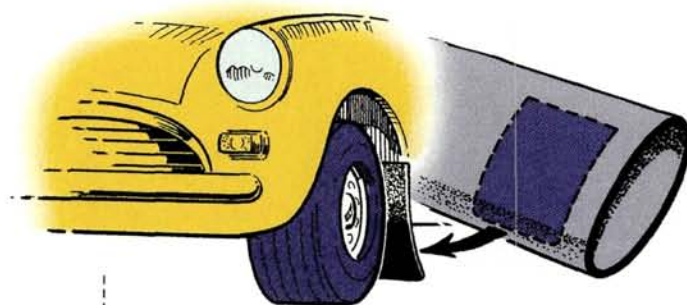
BILL EISENHARD, Carbondale, IL



Quicker Holder-Upper

This folding support for the lid of your parts box is made out of the ever-useful coat-hanger wire. Drill the flange of the lid, then use a short tube spacer (a), and a nut, washer and screw as shown. Notch the edges of the dividers (b) so that the prop will fold down flat whenever the lid is shut.

BRIAN CARROLL, Attica, IN



In a Flap

Cut mud flaps from bicycle inner tube, then glue them to your fenders. You will probably need to glue some brackets made of bent Lexan into the fender wells to support the flaps.

JONATHAN CONRAD, Dartmouth, Nova Scotia, Canada

Where There's Smoke ...

I read your mag all the time. I am having trouble with my Team Losi XX-*'CR'*, and I'm really baffled. It's equipped with a Trinity Onyx 14-turn double motor and 7-cell 1700 pack, full bearings and a Novak Cyclone speed control. It usually works very well, but lately, the positive motor wire keeps coming off whenever I run it, even when I change from 1400 to 1700 battery packs.

The last time, I saw smoke coming from the motor, and then the car stopped. The part of the motor where the brush hoods are connected was just hanging off.

I know I have to get a new motor, but what's the problem?

Is the slipper too tight?

CHRIS CHANDRA

Santa Cruz, CA



Chris, I would be willing to bet that the slipper clutch isn't your problem. The Team Losi XX-*'CR'* is a super buggy and can easily handle a modified motor under almost any conditions, so your problems most likely aren't related to the car as much as to the motor and batteries. When you installed the 14-turn mod motor, did you change the gearing at all? Modified motors, especially those as hot (no pun intended) as your Onyx, require a pinion that's several teeth smaller than the one you used with a stock powerplant. So it's possible that your motor is way overgeared, a condition that could easily cause the severe overheating you describe. When the motor gets hot enough to melt the solder connections on the terminals, or to lose the brush hood hardware, it's time to take a serious look at correcting the problem. Couple the gearing challenge with the additional voltage and attendant amp draw of a 7-cell pack, and you're talkin' toasty! I would suggest that you pick up another Onyx (it's a good choice for this application) and drop a few pinion teeth when you install it. If you're still using the stock 84-tooth spur gear, use a pinion in the 17- to 20-tooth range. If the motor is still way hot after running it for two or three minutes, check the tranny and drive train to make sure that nothing is binding.

Shafted!

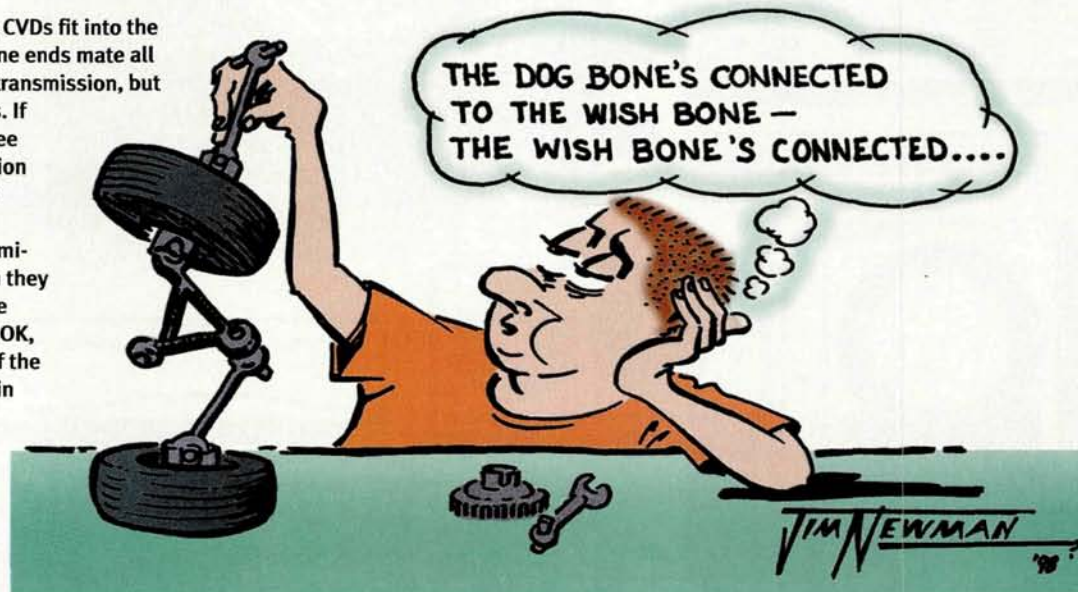
I have a Traxxas Stampede with a Trinity Sapphire 17-turn motor and a Tekin Rebel speed control. My problem concerns the MIP CVD drive shafts I bought for it. The stubs turn, but the CVDs don't seem to move at all. I've tightened them a bunch of times but it doesn't seem to do any good. Could you please help? By the way, the magazine is great!

J.M. SMUCKER

Killbuck, OH

J.M., if I understand you correctly, the CVDs fit into the drive system properly, and the dogbone ends mate all right with the output drives from the transmission, but the wheel ends fail to turn the wheels. If that's the case, start by checking to see whether the pins within the joint section are inserted properly. They should go through the inner joint shaft without protruding beyond the ends of the hemispherical outer joint cover. Only when they are seated properly will tightening the setscrews do any good. If that seems OK, next check the drive pins at the end of the axle stubs. Are the pins still inserted in the small hole in the axle?

These dropped out of my vehicle once, and I couldn't figure out why my darn truck wouldn't move! Last, make sure that the drive pins line up with the groove in the wheel where the axle passes through. Sometimes, the pin is a little off to one side, and the wheel won't drop onto the drive pin. If all of these pins are correctly aligned, you should be in business. Otherwise, you'll be going nowhere—fast!



Mechanical Mayhem

First, let me say you guys rock! My Kyosho Outrage has a problem that only you guys can help me with. To get it to move, I have to jiggle the mechanical speed control forward or backward, and then it stalls if I don't increase speed very gradually. The motor is also getting so hot that it makes the rear spoiler fall off, and I can't keep it on the body any longer. Any advice?

MIKE LANDERS

Whitmore Lake, MI

Mike, if you're still using a mechanical speed control, it's probably time to replace or upgrade it. A mechanical speed control consists of a series of switches that feed voltage through a resistor. These switches eventually deteriorate, and this causes unwanted resistance and overheating. If the contacts become stuck in one of the lower speeds, the resistor will get really hot; hot enough to burn your finger or melt plastic! If you can swing the bucks, I would suggest purchasing one of the new, low-cost electronic speed controls that replace the servo, linkage, contacts and resistor. These transistorized wonders are small, lightweight, easy to set up and give you more run time and greater reliability. In addition, you'll be able to upgrade to a hotter motor without worrying about overloading the electronics.



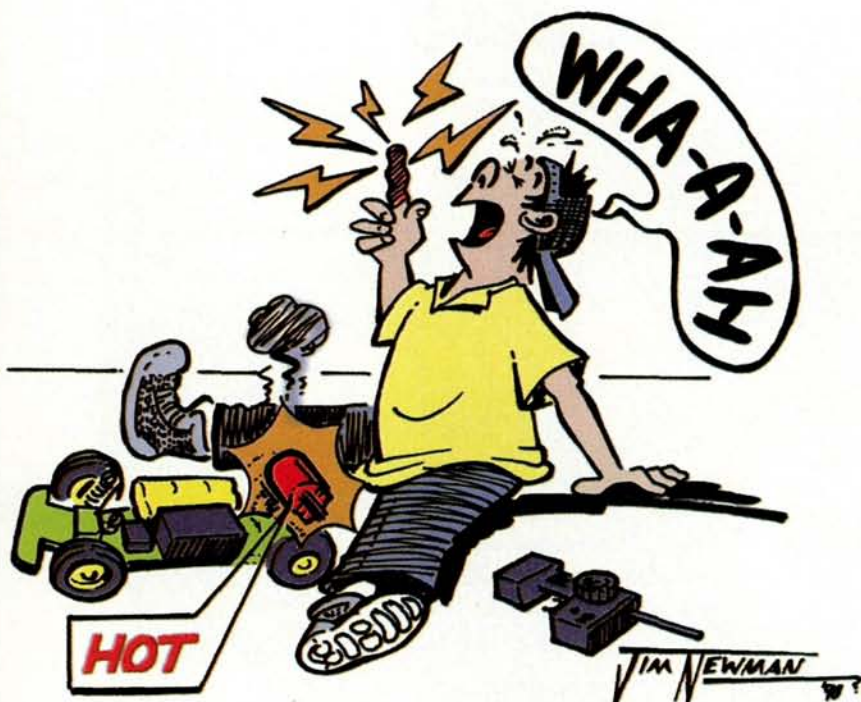
Crystal Clear

I have an Associated RC10B2, and ever since it took a hard impact on its rear, it hasn't run properly. The motor doesn't always run, so I cleaned it out, checked the wire connections and oiled the bearings and brushes, but it still only works part of the time. Sometimes, when I slowly move to full throttle, the motor doesn't want to shut down, and the steering servo won't work, either! My equipment is kind of old (Novak T-4 ESC and a Futaba Attack-R radio), but I'd rather fix it than replace it. Any ideas?

STEVE LESNIAK
Chicago, IL

Steve, you win this month's prize for the total number of letters; you must have sent us at least 10 copies of your question! Seriously, though, it sounds as if your car's troubles began when it got whacked in the behind. It seems as though you've really tried to go through the car to find the gremlin causing the problems, but I think

we can get to the heart of the matter pretty quickly. First, the most fragile electrical component on your buggy is the receiver crystal. I often find that many glitches can be traced to the crystal, and it's not unusual for me to replace them with new ones several times a year (I race a lot, but I also crash a lot). Swap crystals with a friend who has the same model transmitter and see if that helps. It's also possible that the speed control is experiencing problems with the voltage regulator, but this would be very unusual. Last, check the motor and make sure that the brushes weren't broken in the accident; if they're obviously worn or chipped, replace them. It's also a good idea to lube the bushings regularly, but you should never oil any other part of the motor—especially the brushes. That will merely obstruct the flow of electrons between the brush and commutator, slow down the motor and cause erratic performance.



O.S. LD In Action



O.S. Max's revolutionary .12LD (laydown) low-profile was designed from the ground up as an R/C-car-only engine. Did you ever stop to wonder why the heads of our car engines tower straight up through the bodies, often destroying the awesome look of our favorite scale machines? It's because in the beginning these engines were merely adaptations of R/C airplane engines. These "evolutionary" beginnings have always been glaringly apparent in our car engines—until now!

The new LD engine can be bolted directly into Kyosho's Super Ten chassis without any modifications.

Now that Tamiya* has created a low-profile street machine just for this engine, rumor has it that

other manufacturers will soon follow suit.

Well, in response to general excitement about the LD and LD-X (pull-start version), here's a closer look at this innovative powerplant and its performance characteristics.

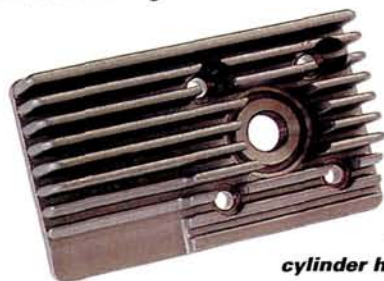
I bolted the LD into my trusty Kyosho Super Ten (which is drilled at the factory for this engine), applied the "Piston Power" green and white colors to a new McLaren body and

hit the streets. Using 15-percent-nitro fuel containing 18-percent lubrication, I broke in the engine for about 45 minutes; this consisted of many short, coasting runs in the shade. After this (and cool-off periods), I started to lean out the top-end fuel mix a bit to see what the LD would do.

In terms of power, the engine feels like it is on a par with an O.S. CV, so it's no slouch by any means.



The single-piece crankcase/cylinder is beautifully investment-cast in typical O.S. fashion. In both the crankcase and cylinder areas, the unit is covered with fins for optimum cooling. An internally machined oil channel forward of the intake port effectively lubricates the front ball bearing.



The top view of the cylinder head shows long and deep fin treatment.

Thank you, O.S! The .12-size engines deserve the linear throttle-response benefits afforded by a slide carburetor, too. I'll probably get some hate mail about this, but here goes: the barrel carb is a carryover from R/C aviation. For the crucial midrange throttle response that's so important in racing, slide carbs are far better—end of story.



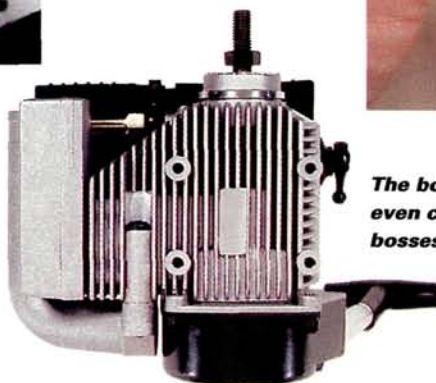
Piston and sleeve are ABN technology: an aluminum piston runs in a nickel-plated brass sleeve. I was happy to see that the connecting rod is bronze-bushed at both the crankpin and the wristpin ends, and each is well lubricated with its own oil passage. The free-floating wristpin has a Teflon pad at each end.



The cooling shroud has a quick-change air filter that can be "wetted" with light oil for even better filtering.



The bottom view of the LD; there are even cooling fins here, too! The four bosses are for mount purposes. The solid bar at the left end is the side of the cylinder head.



PISTON POWER

Like the CV, it screams. It does, however, have one very important advantage over the CV, in my humble opinion, and I'm not referring to its unorthodox design. It's the carburetor! The designers at O.S. opted for a slide-valve carb and, man, am I glad they did! When adjusted properly, this unit gives instantaneous throttle response from various rpm settings—the kind of solid linear response throughout the throttle range that is so crucial when darting through the turns. Remember, the straight-aways are far less important in anything but a drag race. A slide-valve carb gives the kind of response that was simply not obtain-

able with the rotary-barrel-style carb typical of .12-size engines—until now. The importance of good throttle response on a roadcourse simply can not be overstated. If you want to road race, you need positive throttle response, and in this department, the LD delivers!

Another question that comes to mind when considering a radical design such as the LD is: how well does the thing cool? My answer is: very well, thank you. Not only is the LD literally covered in cooling fins, but, again by design, the Super Ten chassis also doubles as a heat sink. Because the engine is installed on its side, two of the mounting-bolt bosses



"You don't know what yer doin', do ya, mister?"

are in the side of the crankcase, and the other two are in the side of the cylinder case. While all four dissipate heat away from the engine, it's the latter two that draw heat away from the hotter cylinder and transfer it to the chassis. I love this engine!

The tech guys at Great Planes* (distributor of O.S.) told me that after initial break-in, there's no need to cut large cooling holes in the car's body as we do with conventional engines. I simply cut part of the rear of the McLaren

body away to vent hot air out through the back, and the ground effects took care of the rest by drawing fresh air up from underneath and then through the chassis. I ran the LD extensively in fairly hot weather with a "competition" needle-valve setting, and it cooled well throughout.

The LD is approximately 1.5 ounces heavier than the equally powerful CV, but I say, so what?! Not only is that a very small weight difference, but it's also centered much lower

on the car because of its laydown position.

If you want an engine that has competitive power, won't spoil the looks of your latest sleek scale prize, has a cool factor of 10 and has a throttle response that can be likened to a rattlesnake's strike, take a look at the O.S. LD and LD-X. This engine is not only something totally new, but it's also something that really works!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■

ENGINE COMPARISON

	O.S. LD	O.S. CV
Rpm range	3,000 to 30,000	3,000 to 30,000
Power output	0.56hp @ 29,000rpm	56hp @ 29,000rpm
Weight	9.64 oz.	8.1 oz.



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Bodies: Many Styles to Choose From
(Mc Laren F1 GTR shown below)



What I've learned from spec class racing, Part 3

For spec-tacular performance

If you've read the first two installments in this series of articles (RCCA April and June '98) on Street Spec racing, you're probably wondering if I ever get the darn thing out on the racetrack. Actually, I manage to get into competition quite often on the local, regional and—hide the women and children—national level. Each time I race head to head against a field of spec drivers, I discover something new about myself, my car and the chassis-setup techniques for this class.

The first thing I learned was that even in a Spec class where all of the equipment is strictly regulated, racers aren't exactly equal. In fact, one of the embarrassing things about Street Spec, especially at the national level, is how humbling the experience can be. Once the equipment advantage has been removed, differences in driving skills and setup abilities become, shall we say, alarmingly obvious. The good guys don't get any slower, they just manage to use their skills to put you a lap down. Since you can't defend your honor by blaming equipment ("The guy who beat me is sponsored!"), you have to accept that the folks in the higher Mains are, well, better drivers than you.

The second fact that soon became apparent to me was that good driving and setup skills don't guarantee a spot in the big show. It takes fanatical attention to the tiny things—the little details—

to be one of the last eight drivers on the stand. With no major advantage available from high-zoot batteries or motors, it becomes a contest of who can discover—and correct—the most performance disadvantages. The astute tuner can increase performance enough to reach the A-main (as long as the driving skill is there, too!). It ain't easy, folks.

So I studied the car, walked around the pits, charged some batteries, tried a few changes, wandered around, talked with fellow racers and then came up with six performance-enhancing techniques that seem to really make a difference. I tried them out in my secret underground laboratory to be sure that the results were repeatable and that the techniques consistently increased the performance of my Street Spec chassis. Each has made me a little bit faster (there's no such thing as a whole lot faster when

you're talking Street Spec), and I recommend them to you without reservation. Enjoy!

CYCLE YOUR PACKS

When I purchased the five official Trinity* Ex Spec battery packs used throughout my testing, I cycled them on the Pro-Trak battery-matching system by Ballistic Batteries*. This charger/discharger/cycler is a pretty nifty piece of equipment that rates assembled packs. The numbers averaged 235 seconds of run time with a pack voltage of 5.95 volts at a 20A discharge rate, and results were consistent. Each pack was within 5 seconds of this average run time and a few tenths of the average voltage, so I figured that everyone would wind up with equivalent battery performance.

After I had cycled the packs four or five times, however, I discovered that the average voltage had increased to 6.22—up over $\frac{1}{4}$ volt—but there was no deterioration in run time. It pays to cycle your packs a few times before you run them in competition!

To cycle the packs at a rate equivalent

to actual discharge circumstances, charge them and use them in practice until they're totally dead, or charge, reapeak and then discharge them using a set of light bulbs. If you have access to a Competition Electronics* Turbo 30 or Pro-Trak, you'll be able to rate the voltages and run times. Each time I used the packs the voltage increased slightly, until they reached maximum performance at the eighth cycle. It was also worthwhile to practice with these packs on the day before racing, as a discharge cycle 24 hours or so before competition seemed to produce higher voltages on race day.

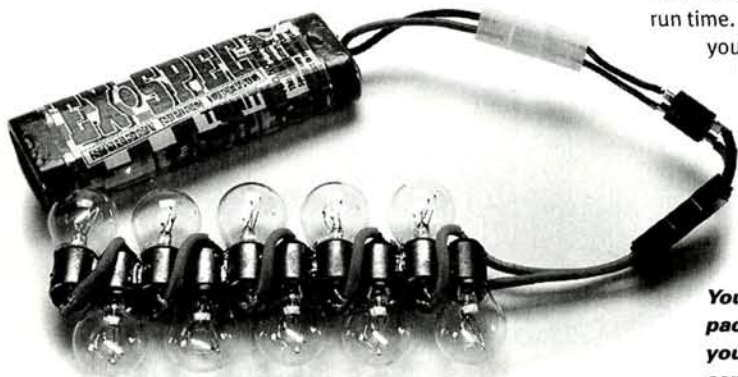
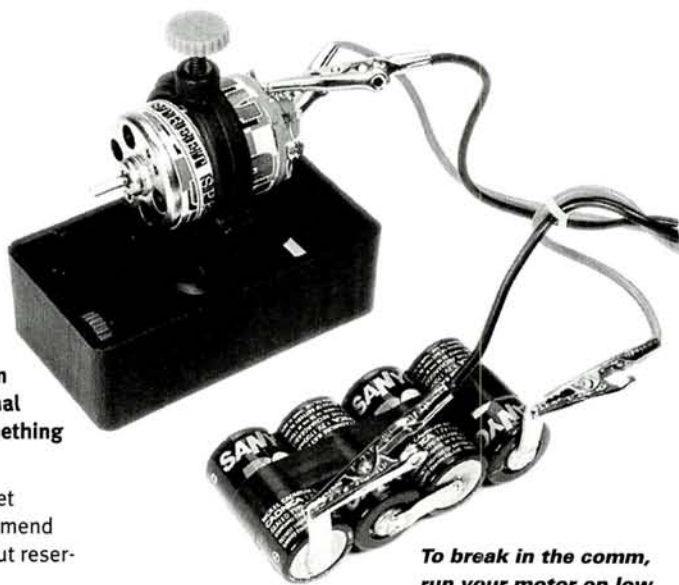
BREAK IN YOUR MOTOR

This tip will blow your mind: to increase its performance, run your motor for a couple of hours or so under a moderate load with the official Spec brushes and slightly tweaked springs. Yes, I know this flies in the face of everything you know about stock motors, but trust me when I tell you it works. At the Street Spec

To break in the comm, run your motor on low voltage (a 4-cell pack or 5V power supply will work nicely) with a small fan. An hour or two should do the trick.

Nationals, I watched as racer after racer took his brand-new handout motor, installed brand-new Spec brushes and ran the motor at 4 or 5 volts for the entire morning before the qualifiers. Each racer had a motor stand and a small fan mounted on the output shaft, and many used Turbo 30 chargers to power the motor because it allowed them to keep an eye on the amp draw while the comm and brushes were being broken in. During the break-in period, many dripped Trinity Formula 96 comm drops into the motor from time to time to accelerate comm wear. These drops attack the copper in the comm and continually expose a fresh layer to the super-hard spec brushes.

I asked one of the front-runners to give me a hand with my motor (hey, I need all the help I can get!) and watched as the amp draw climbed from 4 to just over 8 amps in the course of almost two hours. No cleaning, no brush removal; just lots of constant running that I was certain would wear out my new motor. I'm not sure



You don't need fancy equipment to cycle your packs; a bulb discharger is all you need; or, if you have the time, go to the track and run your car! This is definitely the fun way to do it.

what secret comm-drop combination he used, since he declined to tell me its contents, but it did the trick. The comm wound up with a measurable groove in it; had it been a normal stock motor, it would have been long overdue for a visit to "Mr. Lathe." Post-race readings on my trusty LavCo Pro dyno (dynamometers are strictly *verboten* at Street Spec races) showed an increase of several thousand rpm and almost 40 power numbers!

By the way, my motor helper turned out to be top qualifier and he finished second in the A-main. I was, ah, not so fortunate in my races, but I sure had a hot motor!

SOFT AND HARD SPRINGS

Contrary to my "oval instincts," at the Street Spec Nats I was advised to

lean to the right in a left turn and thus take weight off the left rear tire. This reduced the tendency of the chassis to try to straighten before the turn had been completed and the weight had been restored to the left wheels for the short straight—I think; either that, or it's voodoo. [Editor's note: Doug, it's voodoo. You have to tape a chicken foot to the chassis. Don't you know anything?]

REAR STAGGER

Through Trinity's excellent and highly interactive "Tech Talk" Internet site I had learned that a little rear stagger would be a good idea, particularly on the small track used for the Nationals (how do 58 laps in 4 minutes sound? I'm not sure we ever really went straight!). The practice of using tires of different

turns more slowly during a trip around the track than the outside tire does. The differential's primary duty is to ensure that power is delivered equally to both sides even while the wheels on one side are turning faster than those on the other. By reducing the inside tire diameter so that it must turn at the same speed as the outside tire, the diff doesn't have to work at all, and you gain a teeny bit of efficiency. Remember what I said about small advantages?

REVERSE STAGGER

OK, all you oval diehards, if you're going to use stagger, which side is supposed to be smaller? Usually, the left front tire is a little smaller than the right front if stagger is used at all. That's because the right front tire must

millimeters smaller than the inside one and run "normal" rear stagger (smaller inside tire). I tried this, and it works! Why does it work? Because there's no way to tweak the T-bar on a Spec car, the only way you can transfer weight to the right rear and left front tires (as oval racing demands) is to reduce the diameters of the tires on opposite corners. This predisposes the car to initiate a turn (the normal rear stagger), while it eliminates the tendency of the car to continue turning once the chassis has taken a "set" (the reverse stagger in front). Weird, but it works!

To further ensure that it would stay down when running at high speed, I also placed all of the weight needed to bring the car up to class minimum on the chassis inboard of the left front wheel.

the B-mains comprised Ford and Chevy trucks with blunt noses and boxy side panels. Hmmm

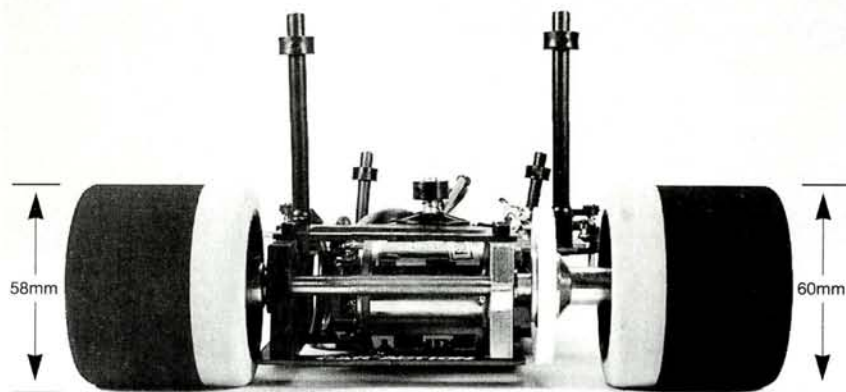
It seems that the vertical front faces of the truck shells eliminated excessive steering because downforce on the front wheels was minimal.

At the same time, the long, flat beds provided smoother airflow to the rear. The small spoilers used by just about every truck racer also seemed to calm the rear ends over the small bumps in the entrance to turn one and along the back "straight" while it rained furiously outside. Huh? Yes, we were racing indoors, but the humidity caused by the rain warped the wooden floor under the carpet and buckled it in a few places—hence, the bumps.

THE BIG FINISH

I raced my Street Spec chassis at half a dozen local roadcourse club outings, the Trinity Road Course Shootout (second place overall, thank you), a regional spec series race at Lugnut (qualified top o' the B) and the Nationals, also held at Lugnut's outstanding facility north of Philadelphia, PA. I discovered that the people who race this class are looking to have fun, rather than simply beat the other guy. At every race I attended, people were helpful and willing to hand over secrets that would bring my performance up to the same level as theirs, and they displayed a camaraderie that makes racing fun no matter how you place. If you ever get the chance, you owe it to yourself to pick up some Street Spec equipment and get into the class. You won't regret it!

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*



The left rear tire diameter is 58mm, while the right is 60mm—a difference of 2mm, or 2mm of "stagger." Stagger helps the car turn left more easily on oval tracks; stagger is never used on roadcourses (left and right turns).

install a softer right front spring. It took me a while to figure out why this worked so well, but I've come up with an explanation. On the Nationals track, the cars were almost always turning; there was no real straightaway. The less you had to move the front wheels to get the chassis to turn, the faster and more efficient the car was. Using a softer right front spring predisposed the front of the chassis to

diameters is called rear "stagger." This rear stagger not only helps the car to turn and accomplish the weight transfer we talked about already, but it also makes things much easier on the differential. Why is this?—or, for you newcomers, *what* is this?

When a car or truck takes a turn in either direction, the inside rear tire takes a shorter path through the turn than the outside tire and, therefore,

travel farther than the left front (different arc lengths, you know), plus it angles the chassis toward the inside of the turn, and that makes it harder for the inside tire to lift up. Since that tire carries most of the responsibility for turning the car through the middle and final portions of the turns, that's a good thing.

Imagine my surprise then, when I was told to use an *outside* front tire that's a couple of

TRUCK OR CAR?

I traveled to the Nationals with several bodies painted, trimmed and ready to go. I figured that either the upright but sturdy Lumina or the sleek, lower and more attractive T-Bird stock-car bodies would dominate the race, but, boy, was I wrong. Sure, a couple of guys used car bodies, and a few of them even made it into the upper Mains. But the entire A-main and most of

FIRST LOOK!

R/C RALLY GETS



HPI

by Peter Vieira

RS4 RALLY

REAL

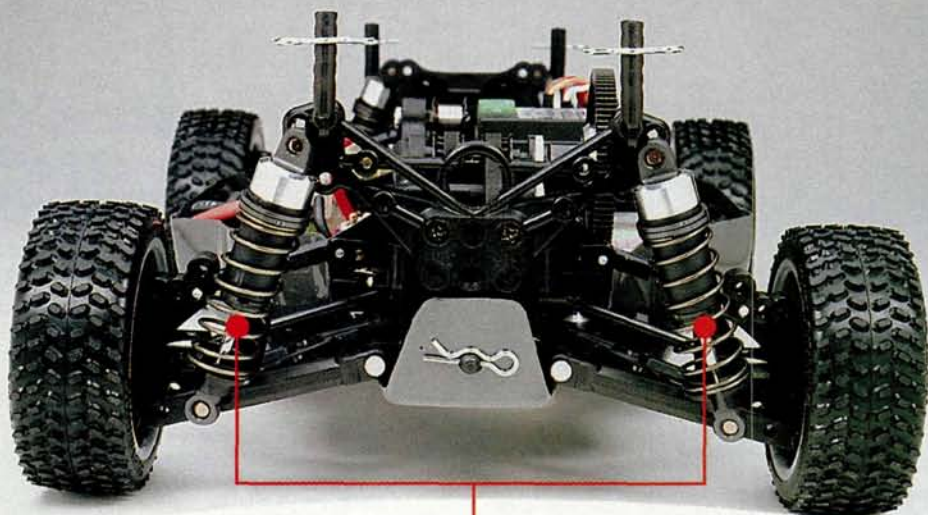


IT'S NO SECRET that we're big on rally cars here at Radio Control Car Action. We converted 2WD buggies into rally cars way back in 1996, and we really dug Kyosho's 1/8-scale Landmax rally cars back in the April '98 issue. But we've been waiting patiently for someone to come up with a "true" rally car that would have 4WD, be capable on-and off-road and—here's the biggie—be compatible with the world of 1/10 electric sedans.

HPI* has stepped up to the challenge with its latest addition to the RS4 line, the RS4 Rally. This isn't just a road-going sedan chassis with a rally body slapped on for the look; HPI has come up with a unique rally concept that should (finally) allow the R/C enthusiast to drive on the same type of terrain as real rally racers. Check it out.

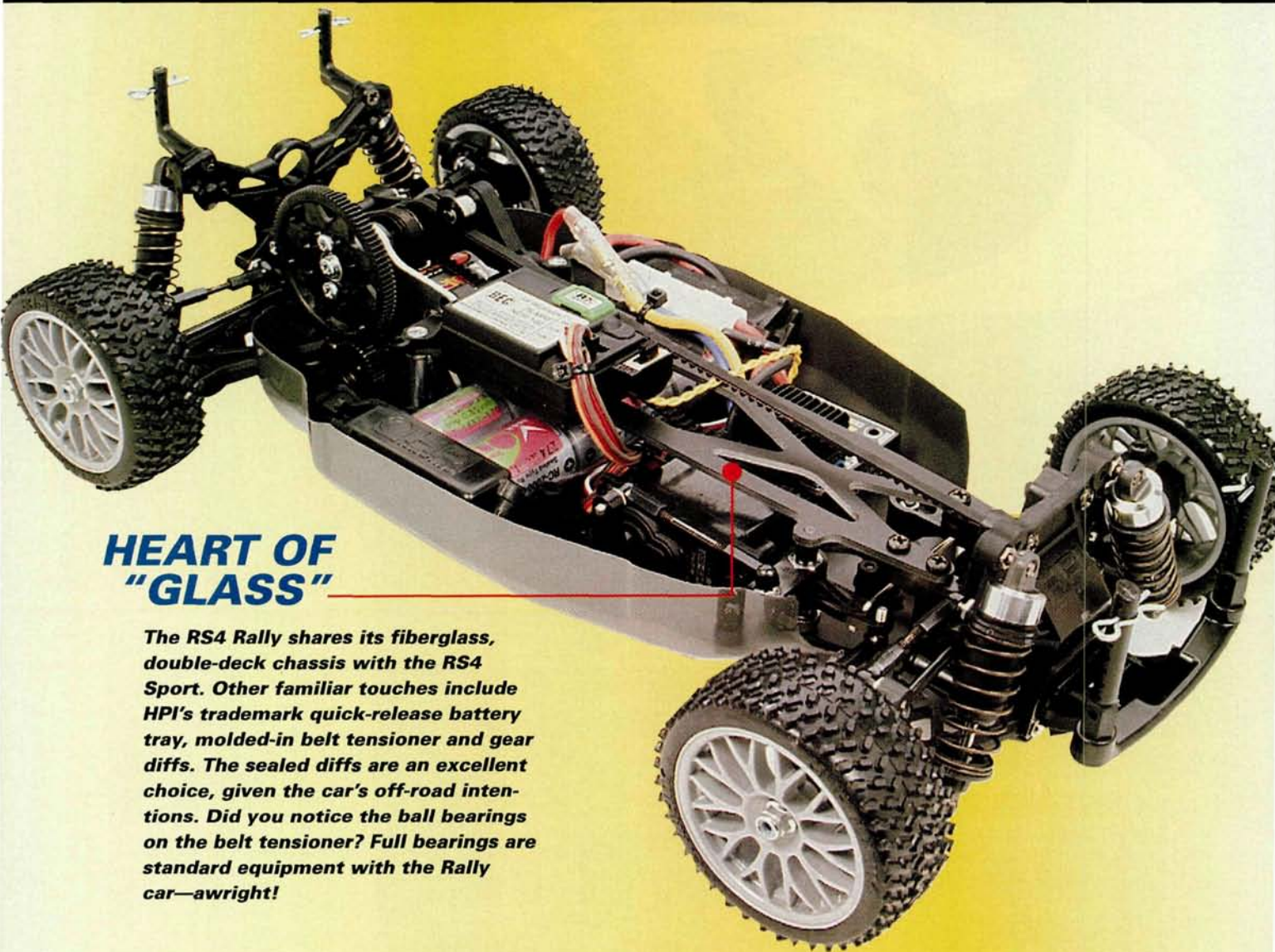
FIRST LOOK!

We can't wait to give the RS4 Rally the full "Thrash Test" treatment. Although we did get to squeeze the trigger on a preproduction car, we're holding out for a production sample we can hammer on! Even our brief run with the car confirmed a high fun factor, however; with capable pavement moves and an appetite for dirt, this car just might be the ultimate dual-purpose, scale fun machine. You could even race it in the sedan class, if you decide you want to give competition a try, but the coolest thing would be an on/off-road rally class (anybody workin' on this?). Many of the hop-ups out there for the RS4 Sport and Pro will work on the Rally car as well, so you can customize to your heart's content. Look for a full shakedown soon!



HOT LEGS

New, longer shock bodies help keep the RS4 Rally from bottoming out and give it a long-legged suspension system. The shocks feature the same durable, composite construction as the other plastic-shock-equipped RS4s and include dirt shields to protect the shock shafts.

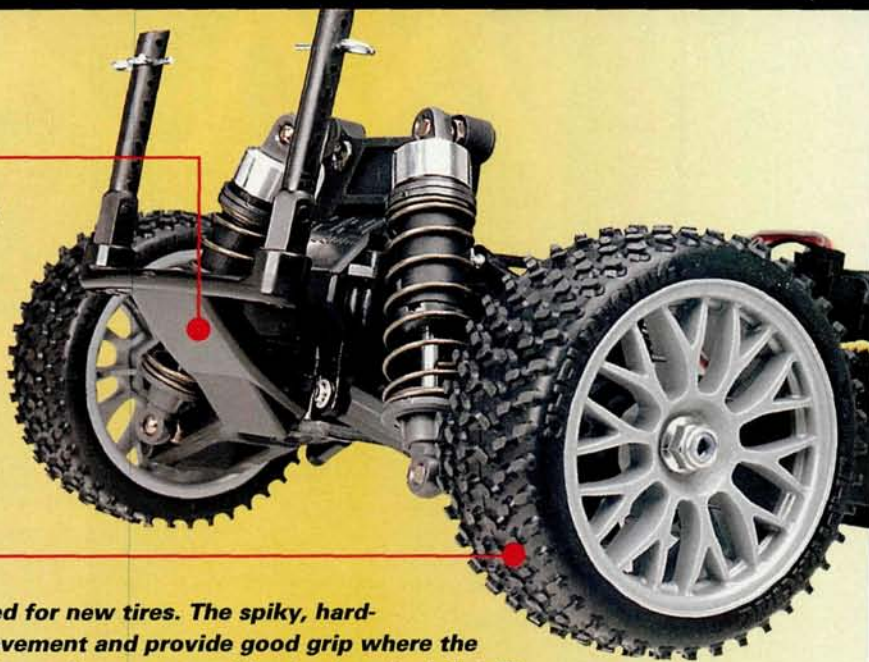


HEART OF "GLASS"

The RS4 Rally shares its fiberglass, double-deck chassis with the RS4 Sport. Other familiar touches include HPI's trademark quick-release battery tray, molded-in belt tensioner and gear diffs. The sealed diffs are an excellent choice, given the car's off-road intentions. Did you notice the ball bearings on the belt tensioner? Full bearings are standard equipment with the Rally car—awright!

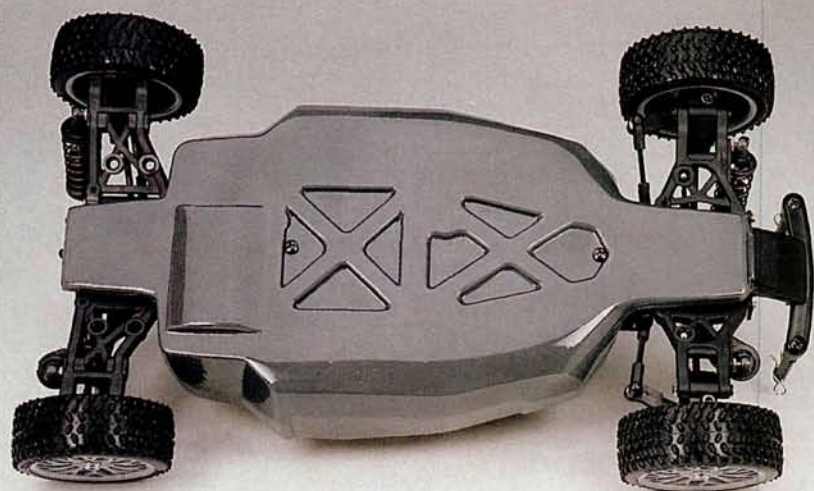
BUMPER CROP

If you've ever tried to go off-road with a touring car, you've no doubt found that the low front bumper tends to auger in when the car approaches bumps and jumps (if it doesn't first get hung up on every rock and root along the way). HPI designed a new, upswept bumper just for the new rally car. The skidplate-like bumper gets the RS4 Rally up and over the rough stuff.



TREAD ON ME

HPI felt the newest mission for the RS4 called for new tires. The spiky, hard-compound treads look as if they'll last on pavement and provide good grip where the pavement ends. HPI plans to offer the tires in a softer compound for hard-packed dirt. The mesh wheels are a good match for the included Subaru Impreza body—an all-new shell just for the RS4 Rally.



FLIP SIDE

Looks pretty cool, huh? The undertray fits the chassis very precisely and is keyed to the chassis' cutouts. Note the screws: instead of threading into the chassis, the screw heads are attached to molded "cams" that swing over the chassis plate to squeeze the tray against the chassis; give the screw a half turn, and the cam releases—very trick. The front of the tray slips into a slot in the front bumper, so rough terrain can't peel the Lexan back.

OUTSIDE IN

Like the RS4 MT, the new Rally car features a Lexan cover that doubles as an interior shell.

A driver and navigator bodies have been molded in, and the attached heads are HPI's standard styrene models. The "interior" is joined to the Lexan undertray with hook-and-loop tape.

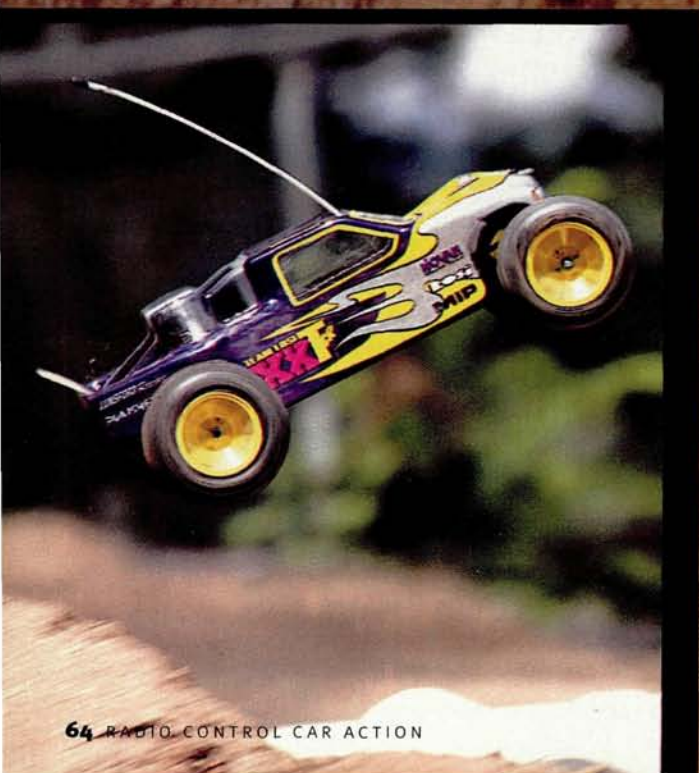


Team Losi **XXT 'CR'** **Graphite Plus**

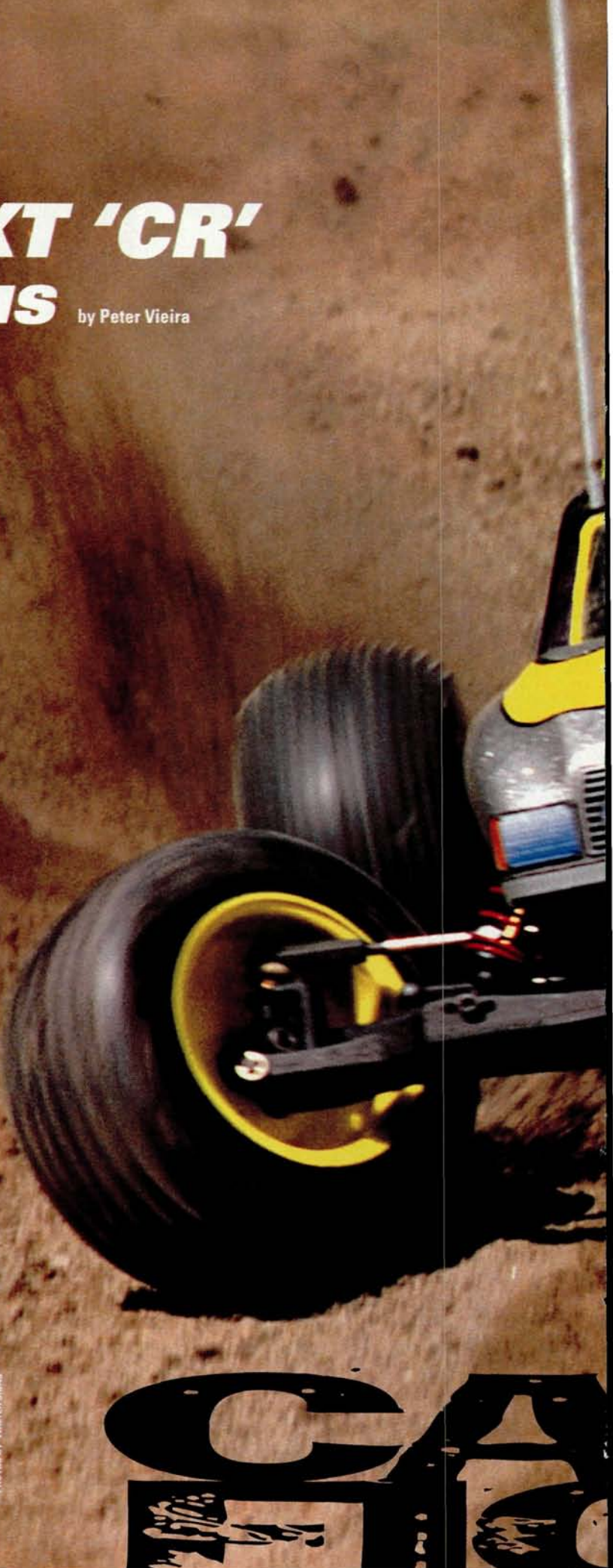
by Peter Vieira

Some of us just have to have it all.

So what if the car can win straight out of the box; why not win by a bigger margin with all the hop-ups? Or, even if all the hop-ups in the world won't help your hack driving, who says you can't own a cutting-edge race car, just for the thrill of driving the best? No matter which camp you're in, Losi's* newest version of the Double-XT 'CR' has to be high on your list of must-have vehicles. The Graphite Plus packs into one kit all the go-fast goodies you could ever want, and you can't beat one-stop shopping! Let's see just how much difference the Graphite Plus upgrades make to Team Losi's off-road favorite.



PHOTOS BY WALTER BUDAS





WHAT'S THE "PLUS"?

Think of it this way: this is the tried-and-true Double-XT 'CR,' *plus* a whole buncha goodies thrown in: not for free, but not for a lot, either. Here's what you get:

- Graphite suspension arms, front and rear.
- Graphite shock towers, front and rear.
- Graphite chassis.
- Titanium nitride shock shafts.
- Dual-disk slipper clutch.
- Hard-anodized aluminum top shaft/top gear.
- MIP CVDs.
- Titanium turnbuckles.
- Ball-bearing steering (in addition to the usual full bearings).
- Combined steering kingpins/ball studs.

We'll go ahead and do the math for you on this. If you were to buy separately all the parts listed, you would spend \$262 (suggested retail); add the cost of a standard 'CR' (\$319.95), and you're out \$582. Team Losi pegs the suggested retail of the Graphite Plus at \$419.95; that's a savings of \$162! For that much dough, you could score a top-shelf matched pack, a hand-wound mod motor and a set of tires!





s p e c s

SCALE 1/10
LIST PRICE \$419.95

DIMENSIONS (chassis only)

Length overall 15.875 in. (403mm)
Wheelbase (adjustable) 11.31 in. (287mm)
Width (F/R) 12.75 in. (324mm)

WEIGHT

Gross, RTR 63.5 oz.

CHASSIS

Type Molded semi-tub
Material Graphite reinforced composite

DRIVE TRAIN

Type Sealed 3-gear
Primary Pinion/spur
Ratio 2.61:1
Differential Ball
Bearings/bushings Bearings
Slipper clutch Double-pad friction
Drive shafts MIP CVDs

SUSPENSION (F/R)

Type Lower arm w/adjustable upper link
Damping Oil-filled coil-over shocks

TIRES

Front/rear Losi Directional rib (silver)/Losi IFMAR pin (silver)

ELECTRICS

Motor Trinity D3 13x2**
Battery Trinity VIS-2000**
ESC GM V12**

** not included

WEIGHTY ISSUE

The first question that springs to mind when considering this truck's "graphite-ness" is, "How much does it weigh?" It's just gotta be lighter, right? We weighed a stock Double-XT 'CR' and the G-Plus (both "naked"—no electrics or body) and found that the G-Plus is 2.2 ounces lighter, with a total weight of 38 ounces. That weight savings doesn't sound like much, but believe me, it ain't chump change. You should also consider that some of the weight reduction comes from the tranny, thanks to the included, lightweight, aluminum top shaft/top gear. The reduced mass of this tranny part is much more beneficial than the few grams it trims from the stock part would suggest;

by reducing rotating mass, the tranny can spool up and decelerate quickly for more punch, faster stops and delayed braking—real racin' stuff.

YOU'LL NEED

- 2-channel radio with receiver and 1 servo. (And don't cheap out on the servo.)
- ESC.
- Motor.
- Battery.
- Pinion.
- Polycarbonate paint.
- CA glue.
- Charger.
- Tools for assembly.

POSITION OF STRENGTH

Most of us think that "strong trucks" are trucks that don't break. It might be more accurate to say that *weak* trucks don't break; if your machine has wimpy, flexible parts, they'll twist and flex before they ever break or shatter; that's why "toy" R/C cars can take so much abuse.

Racing machines, however, must drive a fine line between the strong, stiff parts that won't flex and resilient parts

that won't break. Graphite parts bridge the gap; by including carbon fiber in the plastic formula, the resulting chassis and suspension parts are exceptionally stiff. This means that the truck's suspension transfers bump forces to the shocks (so the dampers can keep the truck under control), and the chassis turns traction and horsepower into acceleration (instead of bleeding off energy as chassis flex). If this degree of rigidity was attempted without the use of graphite, the parts would be too brittle for all but the smoothest drivers. And there's that weight

bonus; the volume of carbon fiber in the plastic weighs less than the volume of regular plastic it replaces, so the parts are lighter. Thank you, mid-'80s defense spending!

BUILDING & SETUP TIPS

The Graphite Plus doesn't build any differently than a standard Double-XT 'CR' (except for the slipper). Here are a few tips:

- The front bulkhead pins are difficult to install, but don't open up the holes; they're supposed to be tight. However, there's no rule against adding a little lube. For best results, be sure to line up the parts carefully. If you have a bench vise, use it to gently press the pins in.
- Use RCPS* Green Slime on the shock seals; this, along with the titanium shock shafts, will give you deluxe damping.
- Put a little Aero-Car* Gear Lube or a drop of Hydra Drive fluid on the top and diff gear for a smooth tranny.
- When cutting the arms from the molding spur, be careful not to cut too close to the arms; you might damage the hinge areas. Shave off the excess material with a hobby knife.

SETUP

- For extra support, I added Trinity's front and rear suspension braces. Aw, who am I kidding? I put 'em there 'cause they're blue. Trinity's blue aluminum screw kit was also added for extra flavor.
- Greg Vogel discovered this clever hop-up for me: RMR Technologies* CVD boots. These soft, silicone gems will extend the time between rebuilds, and they're just plain cool.
- On R/C Madness's bumpy, loamy track, the G-Plus felt the most consistent with the battery pack centered in the chassis; to accomplish this, I cut the foam battery-spacer in half so I could put a block of foam at each end of the pack.
- A few slight suspension changes were made as well:
 - 25WT oil was used with the stock pistons and springs up front.
 - 30WT oil was used with the stock pistons and springs in the rear.
 - Front camber was set at 1° negative.
 - Everything else was run in the stock position. The standard 'CR' runs well with the stock setup just about everywhere, and the G-Plus is no exception.

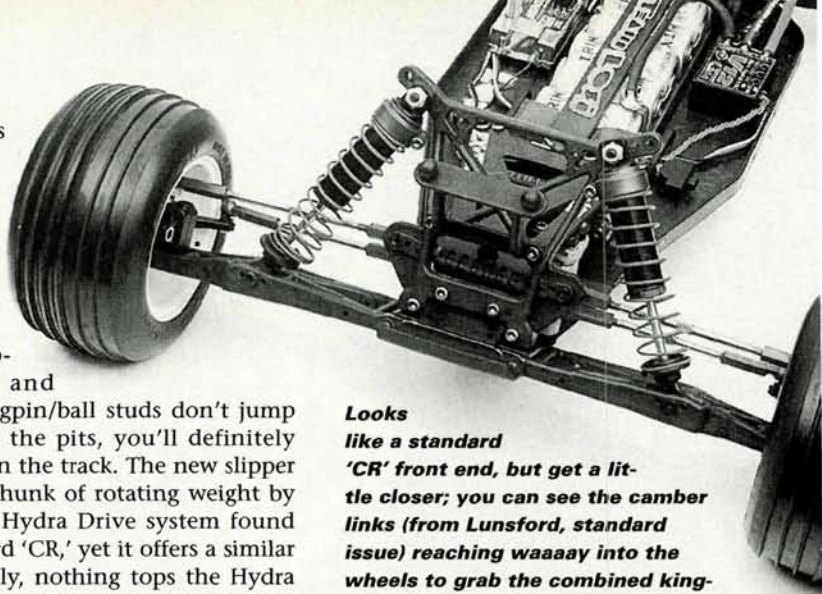
LOSI XXT 'CR' GRAPHITE PLUS

How can we discuss such things as weight savings and strength without thinking titanium? We can't! Lunsford's* titanium turnbuckles are "classic" hop-ups and are standard issue for the Graphite Plus. Of course, they trim fat, but—more important—they won't break (virtuoso hackers excepted).

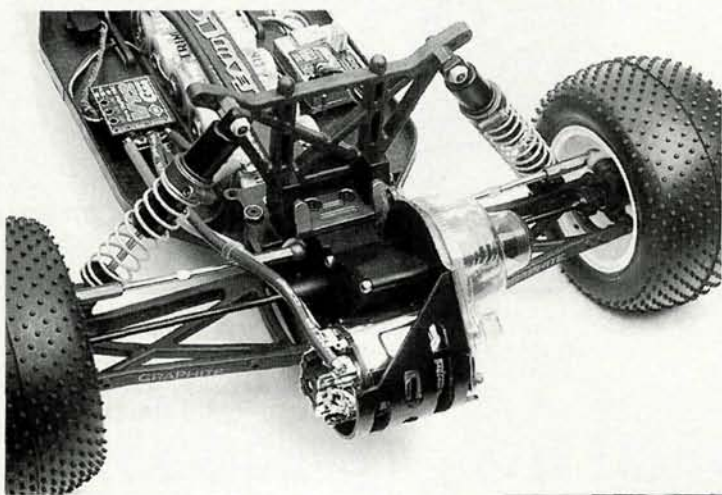
TIME ON YOUR SIDE

Some of the Graphite Plus upgrades have less to do with faster laps and more to do with reduced maintenance, parts longevity and improved consistency. Two prime examples are the titanium nitride shock shafts and MIP* CVDs. The hard coating on the shock shafts is slick, but the primary benefit is hardness; these shafts won't scuff as quickly as plain chrome, so you'll have a better seal that will last longer, and

the changes you're most likely to notice while driving aren't eye-poppers. Even if the dual-disk slipper clutch and combined kingpin/ball studs don't jump out at you in the pits, you'll definitely notice them on the track. The new slipper lops off a big hunk of rotating weight by replacing the Hydra Drive system found on the standard 'CR,' yet it offers a similar feel. Admittedly, nothing tops the Hydra on the really rough stuff, but the new slipper is extra-smooth, even when you strap in the really heavy horsepower.



Looks like a standard 'CR' front end, but get a little closer; you can see the camber links (from Lunsford, standard issue) reaching waaaay into the wheels to grab the combined kingpin/ball studs. Oh, and see all them there plastic parts? They're graphite-reinforced.



Trinity D3 power was used for testing. I also used Trinity's aluminum suspension brace and shock mounts, just to add a little extra blue-ano'd glitz. Below: RMR Technologies makes these neat little boots for MIP CVDs. They keep the crud out!

- Many hop-ups included.
- Excellent value.
- Handles great.
- Easy to drive.

likes

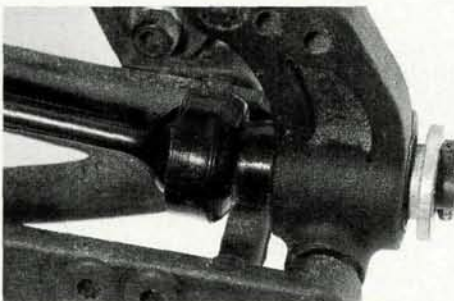
- Front bulkhead pins are still a pain to install.
- Where are the blue screws?
- Can't blame missing the A-main on lack of hop-ups.

dislikes

you won't have to replace the shock shafts nearly as often. Similarly, the MIP CVDs (another hop-up classic) are super-smooth and don't develop play as quickly as standard universals. And once they do show some wear, individual parts are easily replaced, so you'll save the cost of a whole new set. Finally, ball bearings are included for the steering; no bushings to get sloppy, and steering doesn't get any smoother.

ON TRACK

Although most of the trick parts on the Graphite Plus are easy to spot,



Meanwhile, at the front end of the car, the combined kingpin/ball studs quietly improve steering geometry. Although these parts are supposedly most effective on high-bite tracks, I think they offer a subtly more consistent feel on all surfaces. Maybe the effect is psychological; it just seems *right* for the upper camber links to be centered over the kingpins, but if that's the case, so be it. Feeling faster is feeling faster, whatever the reason.

Driven side by side with a standard (and identically equipped) 'CR,' you can definitely feel the difference when you take the wheel of the Graphite Plus version. It feels as if it has a little more scoot, no doubt because it's lighter and the tranny has less mass; there's also the aforementioned, more consistent feel (impressive, given the reputation of the 'CR' for consistent handling on most any track without a lot of tweaking). The truck isn't a quantum leap over its less hopped-up sibling; it's just slightly improved—performance *plus*, if you will.

LAST WORD

Hey, how can you not like the (deep breath for this mouthful) Team Losi Double-XT 'CR' Graphite Plus? If you want to get picky, the extra blue stuff that comes with the Kinwald Edition buggy would have been nice, but as for meaningful performance upgrades, the Graphite Plus has 'em all. Although you do pay a premium for the stuff, it's still a lot cheaper than buying the parts separately (see sidebar, "What's the 'plus?'"). If you're ready to retire your current race truck (or purchase your first) and *must* have all the trick stuff, the Graphite Plus is the way to go.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

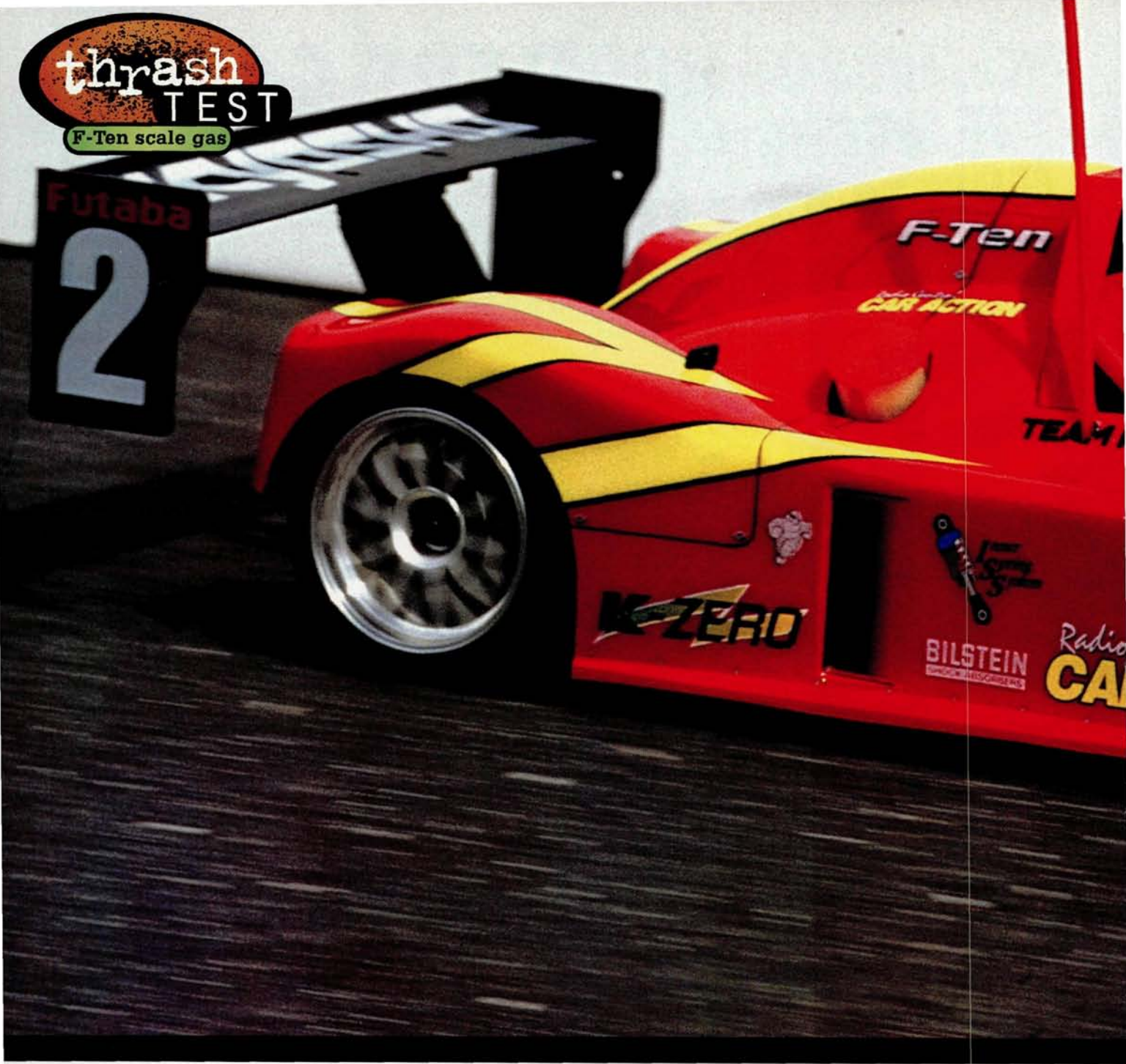
THE COMPETITION

	Associated RC10T3	Team Losi Double-XT 'CR' Graphite Plus
Wheelbase	11.2 in.	11.3 to 11.4 in.
Width	12.5 in.	12.75 in.
Weight	63.7 oz.	63.5 oz.
Diff type	Ball	Ball
Chassis	Molded composite	Graphite reinforced composite
List price	\$340	\$419.95
Available at*	\$199.99	\$249.99
Reviewed in	1/98	10/98

*Prices vary with location.

thrash TEST

F-Ten scale gas



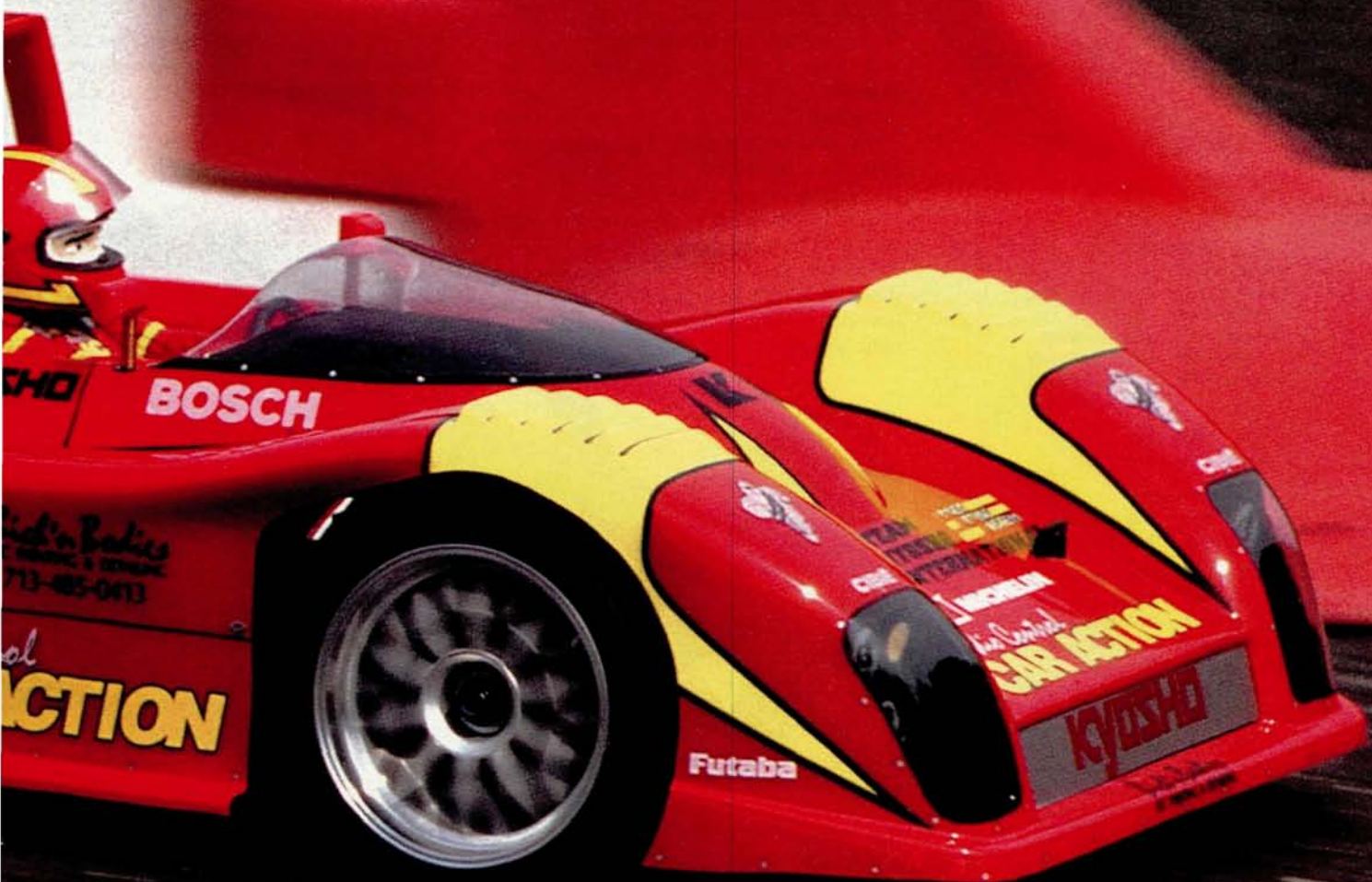
Kyosho **F-Ten Sports Proto**

by ELVIS MACHADO

THERE HAS NEVER been a shortage of scale-looking bodies in R/C, but there has always been a dearth of scale-looking chassis under them. Although I am certainly one to appreciate the unique esthetics of an R/C car, I

have always hoped that one of the manufacturers would offer something closer to the hardware used in real racing sports cars—particularly open-wheelers—and if said car were also big and nitro-powered, so much the better.

As evidenced by the release of the unique F-Ten chassis, Kyosho is on the same wavelength. This highly realistic and innovative machine is available as the Formula Ten (with a stunning F1-style body and wings) and as the*



Sports Proto (with a full-fender, World Sports Car-type shell).

The cars are identical aside from bodies and wings, and they look like an exciting blend of realism and performance. Time to hit the bench!

Perfect



KYOSHO F-TEN SPORTS PROTO



Here's the F-Ten in Formula Ten trim.

s p e c s

SCALE F-Ten
LIST PRICE \$399.99

DIMENSIONS

Length overall (Sports Proto) 20.5 in. (521mm)
Length overall (Formula Ten) 20 in. (508mm)
Wheelbase 12.1 in. (308mm)
Width (F/R) 8.58 in. (218mm)/
8.66 in. (220mm)

WEIGHT

Gross, RTR 62 oz.

CHASSIS

Type Plate
Material Aluminum

DRIVE TRAIN

Type 3-belt 4WD
Primary Pinion/spur gear
Transmission Dogbone drive shafts
Differential(s) Bevel gear
Clutch Two-shoe centrifugal
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Independent upper/lower wishbone
Damping Oil-filled, internal-spring shocks

WHEELS (F/R)

Type Black one-piece plastic
Dimensions (DxW) 60x35mm (2.4x1.4 in.)

TIRES

Type Rubber slicks

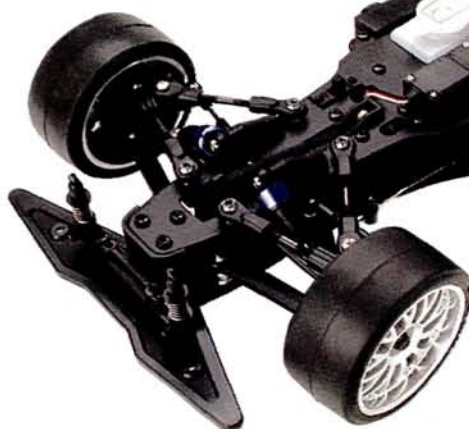
POWER

Engine Kyosho GS-11R
(.11 2-stroke)
Carburetor Rotary
Pipe Expansion muffler
Starting system Recoil starter

KIT FEATURES

• **Chassis.** Two black-anodized aluminum-alloy plates form a stiff, neat-looking chassis. The lower plate is 2.5mm thick and has had a fair amount of material removed to help reduce weight, and since it's aluminum, it will act as an effective engine heat sink. The only bummer is that the screw holes on the underside are not countersunk, so the screw heads will probably scrape on the ground now and then.

The upper plate houses the radio system, which is laid out quite nicely. Though the upper plate isn't very easy to remove (the front suspension must be unbolted), it's nice to know that the whole radio system can be removed in



one shot for cleaning. Kyosho makes it easy to wire the electronics neatly by providing holes to route the servo leads up and over the front belt. Hey, they're only a couple of holes, but it shows Kyosho is thinking!

Finally, the upper plate is attached to the rear bulkhead with two tie rods; this adds extra stiffness to help the suspension do its job. The completed chassis is bigger than the usual 1/10-scale car (the F-Ten has a 12-inch wheelbase), but smaller than 1/8 scale.

• **Engine.** The F-Ten gets its go-power from Kyosho's well-proven GS-11R engine, which is bolted directly onto the chassis on its own cast-in mounts. It features a durable pull-starter that makes firing it up simple and easy with no need for a bulky

starter box. Add a double-O-ring-sealed carburetor with just a high-end needle for tuning, and the term "user friendly" comes to mind.

Feeding the carb is a large 75cc fuel tank that should keep run times long and the fun factor high. To further simplify things, the flywheel, two-shoe clutch and 12-tooth clutch bell are factory-installed, thank you very much. The straight-shot muffler has an unusually large expansion chamber that should help the engine run cooler than is usually expected when running without a tuned pipe. To keep exhaust spooge off the chassis, a rubber "stinger" channels the exhaust out through the wing supports, away from the body and tires. To complete

YOU'LL NEED

- 2-channel radio (a unit with throttle ATV is best).
- Two standard-size servos with at least 42 ounces of torque.
- Receiver pack.
- Glow-plug igniter.
- Fuel filter (optional, but highly recommended).
- Fuel formulated for R/C cars (not planes).
- Polycarbonate-compatible paint for the body.

BUILDING & SETUP TIPS

The best advice I can offer is this: make sure that you read and follow Kyosho's excellent instructions. They are very well laid out and easy to follow. Remember, the more time you spend building the kit, the more time you'll spend driving it. Do yourself a favor and take your time. With that said, here are some other points that might be helpful to you:

■ Hey, I bet you never heard this tip before: always use Loctite* or a similar thread-lock on all screws that thread into metal parts. Vibration produced by the engine tends to loosen screws mighty quick. Do not use Loctite on plastic, as it can attack and destroy it.

■ When tightening screws into plastic, tighten them until they just bottom out and then add a quarter turn or so. This will help you avoid stripping out the plastic.

■ When building the shocks, lube the shafts before you slide them through the bodies so you don't nick the O-rings and cause a leak.

■ To help keep the gear diffs from unloading and spinning the tires, pack them with a heavy grease. I used a pea-sized amount of Trinity's Purple Stuff in each diff and had great results.

■ Install a fuel filter. Your piston and sleeve will love you for it.

■ Use a dry film lube such as Paragon's* Liquid Bearings or Finish Line to coat the ends of the dogbones. This will help to smooth the drive train, but it won't attract dirt that can wear parts faster.

■ Before you mount your tires on the wheels, buy foam inserts to support the soft rubber and improve both traction and tire life.

FACTORY OPTIONS

- Special main chassis—part no. FTW-1.
- Carbon upper deck—FTW-2.
- Stiff shock springs—FTW-3.
- 2-speed tranny—39811.
- Universal swing shafts—FZW-6.
- Steel diff bevel gear—FZW-13.
- Steel diff pinion gear—FZW-15.
- Front one-way diff—W-5111.
- Fiberglass brake rotor—39652.
- Rigid rear diff axle—92501.
- Fuel filter—39308.
- Special engine mount—39648.
- Steering bearings—1902.
- Special tie rods—1FW-2.

KYOSHO F-TEN SPORTS PROTO

the power package, Kyosho also includes a foam filter, glow plug and a cool, low-profile heat-sink head.

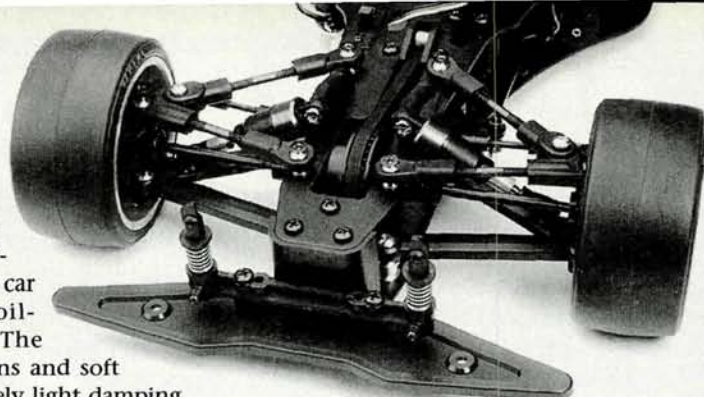
• **Suspension.** Here's where the F-Ten really shines. In its low-profile, double-wishbone design, the front and rear suspension arms are mounted on large-diameter, alloy pivot balls instead of on hinge pins. The upper front wishbones are constructed with threaded rods that allow camber and caster to be adjusted (turnbuckles would

have been a nice touch here). The rear suspension has molded arms with a threaded upper link for camber adjustment. Both ends of the car have plastic-body, oil-damped mini-shocks. The supplied two-hole pistons and soft shock oil provide relatively light damping, and each shock has a blue-anodized aluminum cap for a touch of trickiness.

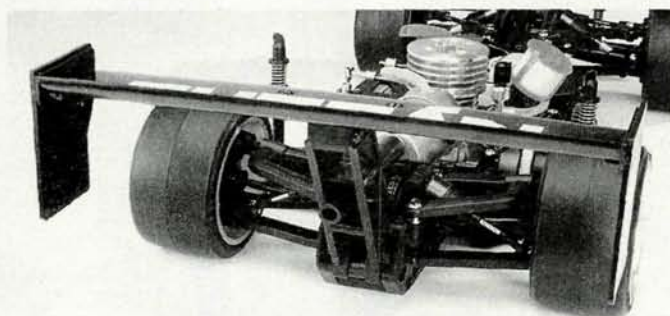
The shocks are mounted on small bulkheads on the chassis and join the suspension arms close to the hubs. You can't see the springs because they are inside the shock body; Kyosho's Inner Spring System (ISS) allows the shocks to be installed between the suspension members for a very

scale-looking, yet effective system.

• **Drive train.** Kyosho's simple, efficient triple-belt design gets the power to all four wheels. Mounted in the front and rear

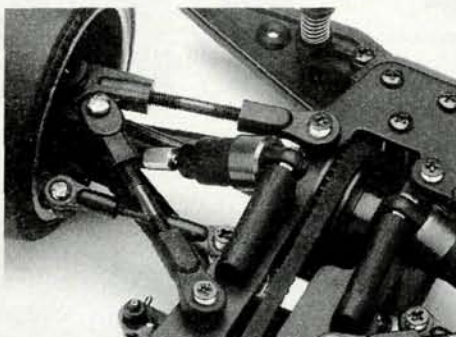
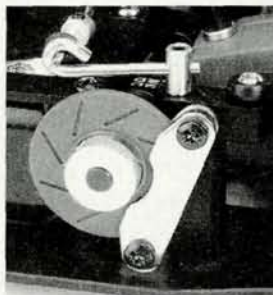


The threaded links used for the upper wishbone allow caster and camber to be adjusted. Note the small tension roller where the belt disappears beneath the top plate.

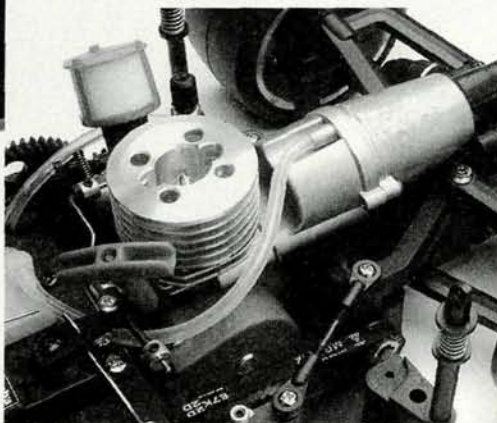


Above: the scale rear wing mount is very trick and allows the wing's angle to be adjusted. There are also inboard rear shocks. Near right: a plastic

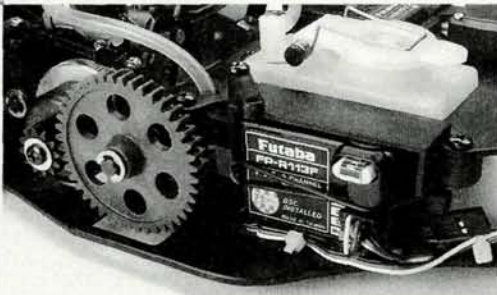
brake disk slows the F-Ten capably. Be careful to adjust the brake so that the steel calipers don't track while the car is running. Right: the GS-11 engine's short-stack heat-sink head fits under both the Sports Proto and the Formula 10 body (no need to cut holes); the straight-shot muffler routes the exhaust out at the rear of the car.



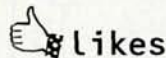
The inboard, oil-damped shocks use an internal spring that allows them to nestle between the upper and lower wishbones. Note the aluminum travel limiter on the shock shaft. Right: the F-Ten chassis uses a handy O-ring receiver mount; keep the antenna wire away from those gears!



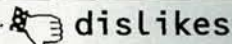
bulkheads are gear diffs that, when built properly (see "Building and Setup Tips"), offer almost the same performance as ball diffs—and with a lot fewer maintenance hassles. Four tough-looking dogbones transfer power from the differentials to the wheels (universals are optional). Braking is handled by a single plastic brake disk and a metal caliper. Plastic isn't usually a very good brake material, but I'll reserve judg-



- Great instructions and parts layout.
- Full bearing kit included.
- All parts fit perfectly; no hand-finishing required.
- Awesome handling.
- Big!
- GS 11 engine includes heat-sink head and is simple to tune.
- Long run times.
- Good-looking body.
- Impressive list of hop-ups.



- Limited body choices.
- Holes in bottom of chassis aren't countersunk.
- Foam tire inserts not included.



ment until I run the car. A set of 16 bearings is stock equipment and makes for a driveline that's silky smooth and virtually maintenance-free.

• **Wheels and tires.** In Sports Proto trim, the F-Ten chassis includes black 5-spoke rims, while the Formula Ten version has black "mesh" wheels (I installed silver mesh wheels on my cars; had to have 'em). The wheels are interchangeable with those of Kyosho's Superten cars, and they accept the same tires. Both versions of the F-Ten come with relatively hard slicks. They are, however, soft enough to benefit from foam liners, which Kyosho does not provide (hiss). Aw, what the heck; if Kyosho throws in the bearings, I can spring for tire liners.

• **Body.** Sports Proto painted by Bich'n Bodies* and Formula Ten painted by Mike Ogle.

TEST GEAR

I prefer to use FM radios in my gas cars, and the Futaba* 3PDF Magnum fits the bill nicely. Its many adjustments make setting up carb linkages easier, and the R113F receiver keeps the F-Ten running glitch- and aggravation-free. The two servos—an S9304 (steering) and S3003 (throttle/brake)—are also from Futaba. Powering the little electronics is a 4-cell battery pack that uses Sanyo 600mAh Ni-Cd cells. A Sullivan* Crap Trap filters Byron* 20-percent nitro race fuel, and Hobbico's* ProGlo Ni-Cd starter clip gets the whole enchilada started.

(Continued on page 200)

thrash
TEST

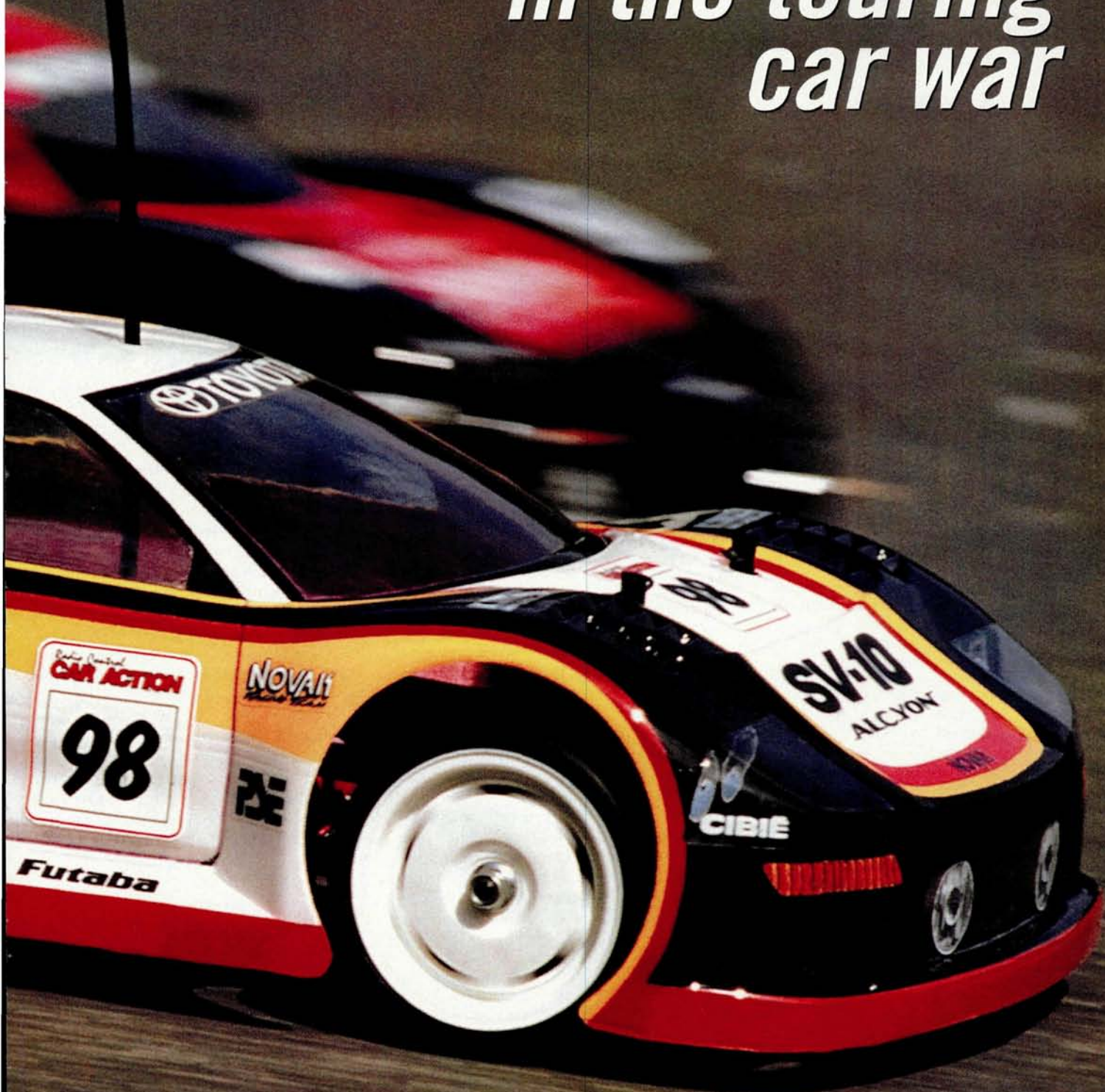
1/10 scale electric



Kawada by LOUIE PATTERELLI SV-10 Alcyon

It's a war zone out there. Unlike off-road and oval/on-road racing, in which two or three manufacturers dominate, touring-car racers have a field of A-main-capable combatants to choose from. With so much competition in this class, any new car has to offer something unique and different (and hopefully better) to stand out from the crowd. Kawada's* new SV-10 Alcyon is definitely a car that says "I gotta be me" by way of its original, innovative design and top-shelf materials. But does it work? I'll have fun finding out!

The latest round in the touring car war



KIT FEATURES

• **Chassis.** "Artfully simple" are the best words to describe Kawada's "VOLT" (Vertical Over-arch Ladder-style Twin frame) chassis. The "vertical" comes from the dual upper plates that are mounted perpendicular to the main chassis instead of parallel with it.

Gleaming carbon fiber is used for the main chassis and the upper plates, which are joined to beautifully finished front and rear bulkheads. The front and rear bulkheads are machined and polished duraluminum (a hardened alloy of aluminum, copper and magnesium). They are bolted to the carbon-fiber

main chassis, which was designed to accept saddle or stick battery packs. The stick pack mounts allow three different battery locations that should prove helpful when fine-tuning the car's handling. Two vertically mounted, carbon-fiber side plates are attached to the bulkheads and form an extremely rigid unit.



s p e c s

SCALE 1/10
LIST PRICE \$399

DIMENSIONS

Length (chassis only) 14.25 in. (362mm)
Wheelbase 10 in. (254mm)
Width (F/R) 7.3 in. (185mm)

WEIGHT

Gross (RTR) 52 oz.

CHASSIS

Type Plate w/2-piece upper deck
Material Carbon fiber

DRIVE TRAIN

Type Belt-driven 4WD
Primary Pinion/spur
Transmission Universals
Differential(s) Ball
Bearings/bushings Bearings

SUSPENSION (F/R)

Type Lower A-arm/turnbuckle upper link
Damping Adjustable, oil-filled coil-over

WHEELS

Type One-piece plastic
Dimensions (DxW) 2x1 in.

TIRES

Type Standard-width slicks w/foam inserts

ELECTRICS (not included)

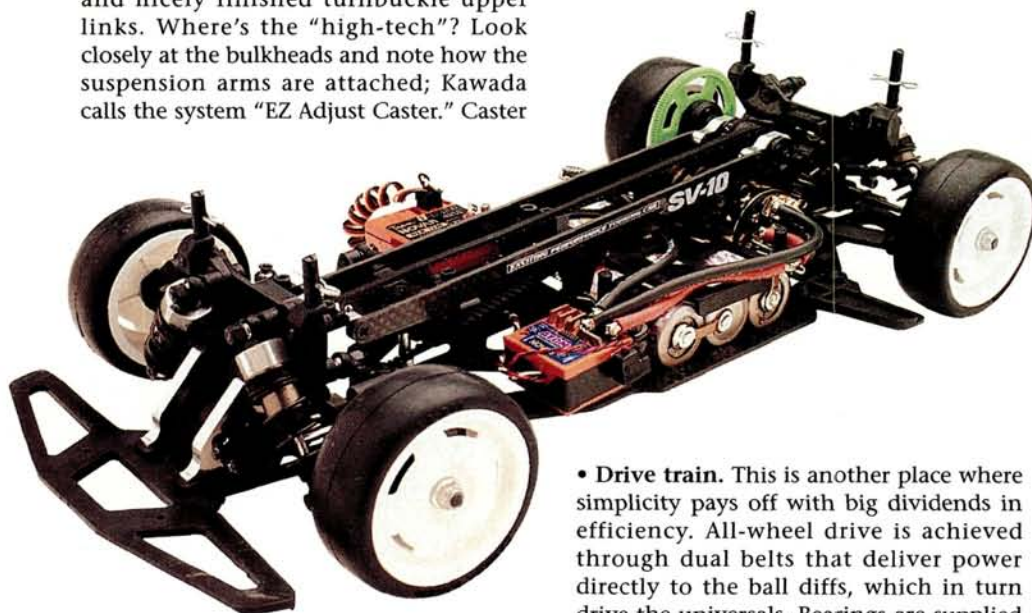
Motor Trinity D3
Battery Trinity VIS-2000
ESC Novak Atom

Instead of the usual dual bellcranks, a single, center-mounted bellcrank is used to keep bump-steer to a minimum. To increase its precision, I replaced its bushings with two 5x10mm bearings. Carbon-fiber shock towers complete the chassis.

• **Suspension.** A simple yet high-tech chassis needs an equally innovative suspension. No surprises here—just thick, fiber-reinforced-composite lower A-arms and nicely finished turnbuckle upper links. Where's the "high-tech"? Look closely at the bulkheads and note how the suspension arms are attached; Kawada calls the system "EZ Adjust Caster." Caster

the shock supports also feature cam adjusters.

Anything less than high-quality shocks would be out of place on this car. The Kawada dampers are Teflon-coated and have different spring rates for the front and rear. There's a generous array of preload spacers, and rubber boots on the bottom of the shock bodies protect the silicone seals against dirt and debris—big points scored for adjustability and versatility.



can be set at 0, 2, or 4 degrees up front and at 0, 1, or 2 degrees in the rear, simply by unbolting a pivot block and moving it up or down. This feature will make you very happy when it's time to dial in your Alcyon.

Another notable feature is that the suspension arms have two sets of holes for the outer hinge pins to allow for a narrow track and a wide track. If you go wide, you'll need longer universal shafts (Kawada will offer these soon). The upper links use turnbuckles to make camber changes infinitely adjustable. The links' positions on the graphite tower can be changed by means of cam-like supports;

• **Drive train.** This is another place where simplicity pays off with big dividends in efficiency. All-wheel drive is achieved through dual belts that deliver power directly to the ball diffs, which in turn drive the universals. Bearings are supplied for everything except the diff outdrives; you'll need four 5x10s to bring the parasitic-drag monster completely to its knees.

A front one-way pulley is included, and Kawada also includes a pinion and spur gear.

• **Wheels and tires.** Kawada supplies 24mm wide "medium-narrow" tires on attractive one-piece rims. The tires are a good compromise between stickier (but slower) full-width tires and faster (but nervous-handling) super-narrows.

BUILDING & SETUP TIPS

■ When assembling the shocks, remember that if you use the kit setup, the front and rear pistons with differ, so it is a good idea to label the shocks. I wrote the number of holes in the piston on the shock caps with a marker. Mark the caps before you finish putting the shocks together.

■ The directions are a little vague on diff settings; I inferred that the suggested setting could be reached by tightening the diff nut $\frac{1}{2}$ turn after the drive cups start to turn in the opposite direction, and that seemed to work fine.

■ Be sure to sand the surfaces of the diff and drive pulleys that have to be superglued together.

■ When assembling the diffs' many parts, I found it easiest to stack all the parts on the 2x20 Allen-head screw. It's a little bit of a balancing act, but it is the least difficult way to thread on the 2mm locknut in diff cup B. Those who recently grew a third hand shouldn't have a problem.

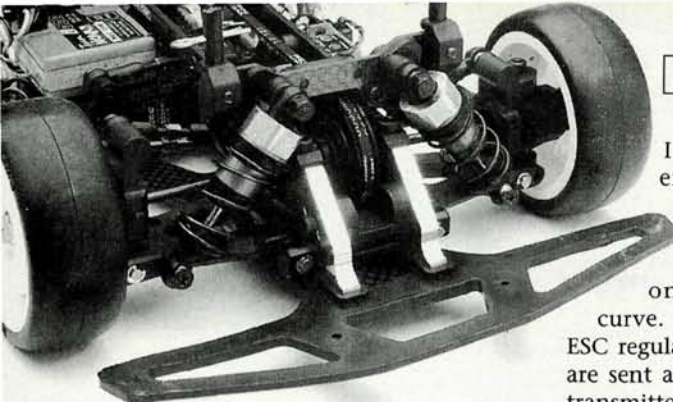
■ With the exception of the diffs, the SV-10 was fairly easy to assemble.

YOU'LL NEED

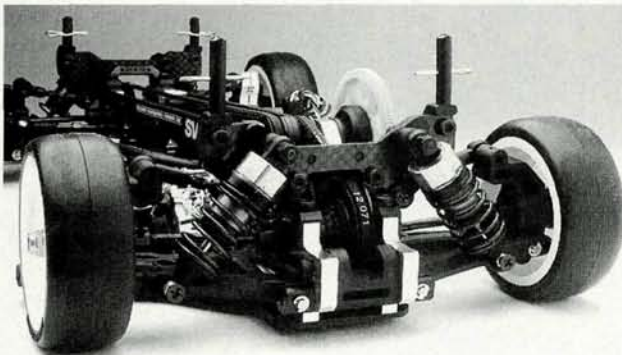
- Transmitter, receiver and steering servo.
- ESC.
- 6-cell battery—stick or saddle pack.
- Charger.
- 190mm sedan body.
- Polycarbonate-compatible paint.

FACTORY OPTIONS

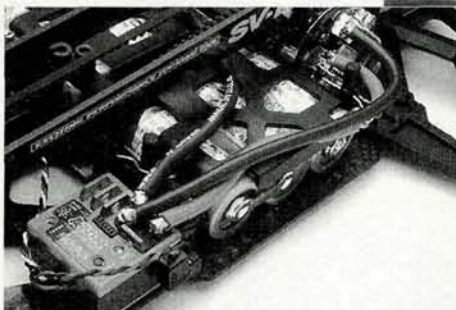
- Hardened universals—part no. SV-20H.
- Lightweight-aluminum one-way pulley (16 tooth)—SV-26L.
- Front one-way housing—SV-50a.
- Front one-way cup—SV-50b.
- Front independent one-way-drive set—SV-50.
- Anti-shock foam bumper—SV-51.
- Stabilizer set—SV-52.
- Motor heat-sink set—SV-53.
- Alloy spur-gear holder—SV-54.
- Tuned spring set—SV-55.



The included bumper offers plenty of protection for the front end—nice touch. (I wouldn't be able to stand it if I messed up those pretty duraluminum bulkheads!)



Above: note the bar through which the rear hinge pins pass; this is the key to Kawada's EZ-Adjust caster system. By repositioning the bar in the bulkheads, you can easily adjust caster. This system is also used up front. Right: the heart of the VOLT chassis: two vertical, carbon-fiber plates that add incredible fore-and-aft rigidity while they allow torsional flex for more forgiving handling.



A stick-pack adapter is included, but for optimum handling, a saddle pack is the way to go. Novak's Atom saves weight without skimping on performance.

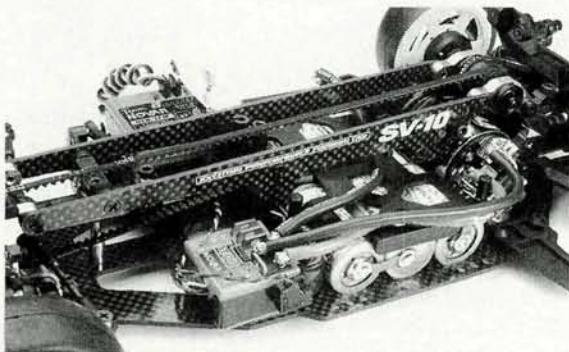
KAWADA SV-10 ALCYON

TEST GEAR

I didn't want to risk under-powering the SV-10 Alcyon, and a Trinity* 10x2 D3 and Team Edition VIS-Extra matched battery pack definitely keep it on the high end of the power curve. Novak's* programmable Atom ESC regulates the battery power. Signals are sent and received by a Futaba* 3PDF transmitter and a Novak NER 3FM receiver, rounded out by a Hitec* 525HS servo that quickly responds to my every directional wish. I topped the SV-10 off with a stylish Toyota MR2 body (also by Kawada).

PERFORMANCE

OK; let's get down to brass tacks. Pretty aluminum pieces and carbon fiber go a long way toward intimidating other drivers in the pits, but the track is where it matters, and this is where the Alcyon speaks volumes about the engineering that went into it.



I went to Monster Hobbies in Boca Raton, FL, to give the Kawada a real thrashing. Monster's track is less than forgiving; it's a tight course with a billiard-table-smooth surface that has about 100 coats of asphalt sealant on it. Even with the staff's best efforts to prep the surface for racing, it's always pretty slick, and the perimeter is marked by some very abusive two-by-fours. If need be, I planned to use every tuning feature the SV-10 Alcyon has.

The baseline setup suggested by the instructions worked just fine. I made only one change: to lower ride height for improved handling, I swapped the shocks'

Likes

- Awesome looks.
- Very efficient drive train; making run time was not a problem.
- Easily adjustable front and rear caster.

dislikes

- Heavy steel pinion.

medium-preload clips for the thinnest ones supplied with the kit. During practice, the car held the track well, and I was looking forward to the qualifiers. However, with the first race came the first bug. As can happen on outdoor tracks, a bit of stone found its way into the gear mesh. This caused the spur's early retirement and my third-lap departure from the first heat.

Race two: a new 120-tooth PSE* Rocket Sprocket solved the spur-gear issue. But I was denied victory again, thanks to a fourth-lap tangle that caused the servo-saver to jump the splines on the servo and lock the wheels all the way to the left. This happened because I used the servo-saver designed for Futaba servos (there isn't one for the Hitec servos). Back in the pits, I used a small strip of paper to shim the output shaft, and that solved bug number two.

Race three (the final): neuroticism makes me check every nut and bolt twice before I set the car on the grid. At the start, I decided to hang back and let the first-turn melee happen without me. Sure enough, the three front-runners wadded their cars, so I cruised around the mess, set up for the turn onto the straight and targeted the Kawada's first victim. Like a rocket on rails, the Alcyon sucked the decals off the car ahead, and it did the same to every machine in the field—twice!

FINAL THOUGHTS

Kawada has definitely given us something special with the SV-10 Alcyon. If you're a serious racer, you'll appreciate what it has to offer. This car does everything well. Out-of-the-box performance is amazing. It's very tunable and easy to drive. So do I like it?—you bet. Do I recommend it?—oh, yeah. But not if you plan to show up at our track; I like winning too much!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

THE COMPETITION

	Kawada	Kyosho	Yokomo	Tamiya	HPI	Schumacher	OFNA	Roadrunner
	SV-10	TF-3	YR-4 M2	TA03F-PRO	RS4 PRO	SST 2000 '98	Z10 PRO	XPRESS
Wheelbase	10 in.	10.3 in.	10.125 in.	10.1 in.	10 in.	10 in.	10.15 in.	10.25 in.
Width	7.3 in.	7.75 in.	7.25 in.	7.19 in.	7.25/7.125 in.	7.25 in.	7.48 in.	7.25 in.
Weight RTR	52 oz.	53 oz.	52.5 oz.	56.7 oz.	50 oz.	50.75 oz.	50.5 oz.	50.8 oz.
Diff type	Ball	Gear	Ball	Ball	Ball	Ball	Ball	Ball
Chassis	Carbon-fiber	Double-deck	Carbon-fiber	FRP**	Carbon-fiber	Fiberglass	Carbon-fiber	Carbon-fiber
List price	\$399	\$259.99	\$425	\$356	\$329	\$369	\$379.95	\$385
Available at*	NA	\$219.99	NA	\$199.99	\$259.99	\$225	\$215.99	\$225
Reviewed in	10/98	1/98	11/97	10/96	10/97	12/96	4/97	4/97

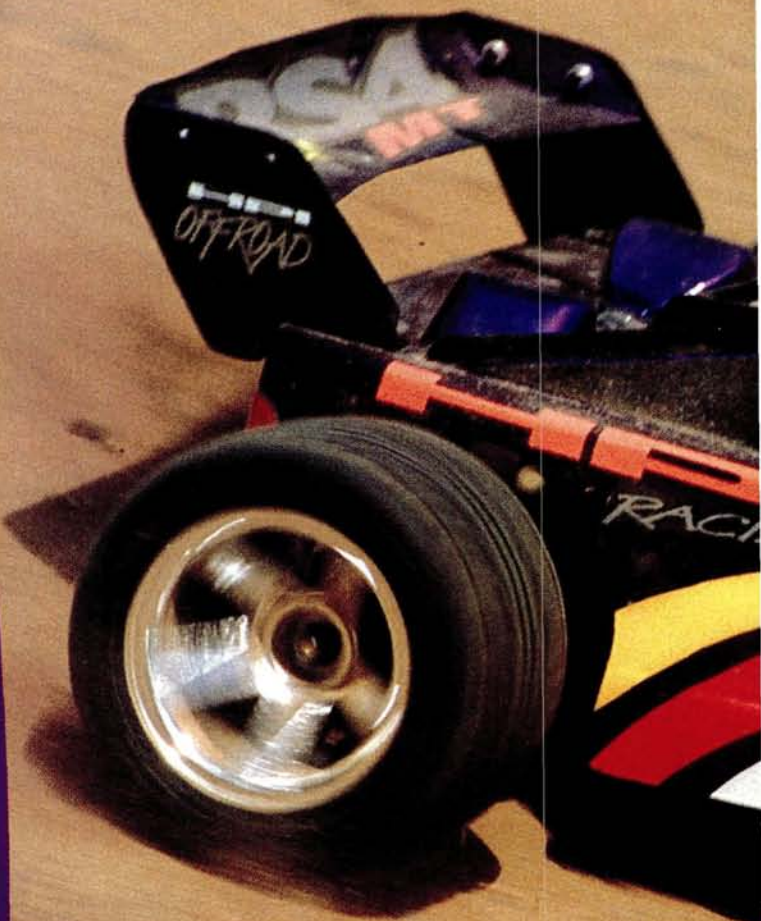
*Prices vary with location. **Fiberglass-reinforced plastic

by PETER VIEIRA

HPI RS4 MT

Everybody likes trucks. I like trucks. Dogs like trucks.

Everybody likes touring cars. I like touring cars. I don't know if dogs like touring cars. But I do know that no truck will ever do what a touring car can do and vice versa. Dirt-hurling, off-road action with a low-slung sedan? No way. Laser-precise handling around a tight, on-road course with a truck? Not gonna happen—until now, that is. The HPI* team have established a whole new class of R/C machine with their innovative RS4 MT, which we gave the “First Look” treatment to in April 1998. Now, it's at last time to reveal what this amazing amalgamation of on-road athleticism and off-road aggression can do.



Multi-terrain machine



SCALE 1/10
LIST PRICE \$219

DIMENSIONS
Wheelbase 10.5 to 11.25 in.
Width (F/R) 12.25/12.5 in.

WEIGHT
Gross (as tested) 67 oz.

CHASSIS
Type Molded semi-tub
Material Composite plastic

DRIVE TRAIN
Transmission Belt
Differential(s) Bevel gear
Slipper clutch Single-pad friction
Bearings/bushings Bushings

s p e c s



GEARS
Pinion/spur HPI 22/96

SUSPENSION (F/R)
Type Lower A-arm w/threaded upper link
Damping Plastic oil-filled, coil-over shocks

TIRES (F/R)
Type HPI V-groove truck

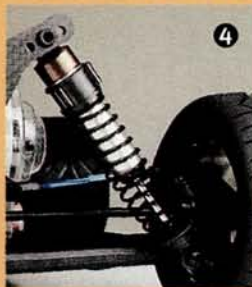
ELECTRICS
Motor, battery, ESC Not included

GIMME ALL THE HOP-UPS

No matter how well a car works out of the box, I am compelled to hop it up—always have been; always will be. Like all of HPI's vehicles, the MT is well supported with trick upgrade parts. Here's what I added to create my RS4 MT "Pro":

HPI STUFF

1. **Front one-way diff**—part no. A906. This gives the truck a lot more steering. Be warned, though; only the rear wheels will have brakes (and reverse, if you have a reversing ESC).
2. **Heat-sink motor plate**—A289. This is a must-have in my opinion. The greater mass and machined fins help pull heat off the motor.
3. **Graphite rear shock tower**—A705. I'll be honest; it's only on there because it looks cool.
4. **Super Shock set**—A725. There's nothing wrong with the stock dampers, but the aluminum Supers will last longer. And there's that "cool" factor again.
5. **Front chassis brace**—A700. More eye candy, but very functional, too. The carbon-fiber brace stiffens the nose of the chassis considerably.
- **Ball-bearing set**—B043. Gotta have 'em. I don't build anything without installing bearings.



AFTERMARKET STUFF

6. **MIP* CVDs**. Yep, they've got 'em for the MT. HPI also offers its own universals.



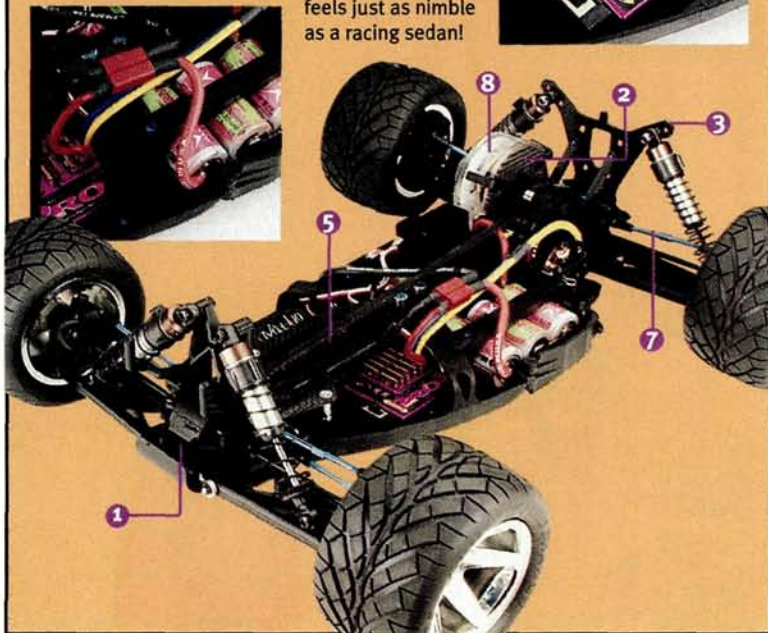
7. **Factory Team by Associated* titanium turnbuckles**. Not only do these add adjustability with the strength and low weight of titanium, but they're also blue! Gotta have the blue stuff. That's why I also added ...
- **Trinity blue screws**. I suppose these saved me a gram or two, but they're on the truck for their blueness.

8. **Robinson Racing* Stealth spur gear**. There's nothing wrong with the stock gear, but the MT's black-on-black-on-black chassis needed a little color. It doesn't hurt that the Stealth gear is lighter and has that smooth Robinson mesh.

OTHER STUFF

You'll also notice that I opted for a saddle-pack layout (racier, but less convenient) with Team Orion V-Max cells and upgraded to GM Racing's Pro reversing ESC. The Pro MT also features a short-wheelbase setup (achieved by flipping the rear suspension arms) and wears a set of Pro-Line Street Hawk sneakers. With this setup, the MT

feels just as nimble as a racing sedan!



KIT FEATURES

- **Chassis**. Although HPI once offered a plastic chassis for the Tamiya* TA02, the RS4 MT is the first HPI kit to forego fiberglass or carbon-fiber plate in favor of a molded, semi-tub chassis. The main chassis has three pieces: the large, lower "tub," a small nose plate that bridges the steering bellcrank pivots and front bulkhead, and a Y-shaped brace that reaches across the width of the tub. The completed structure feels more resilient than stiff, and although it is sufficiently unyielding for off-road use, there is a bit of flex in the unbraced area between the nose plate and the aforementioned "Y" brace.

In typical RS4 fashion, the battery's installation is via a swing-away door and molded-in battery tunnel. If you prefer, you can use saddle packs simply by flipping over the battery-retaining bars; they're smooth on one side for use with stick packs and scalloped on the other to gently hold side-by-side cells.

- **Suspension and shocks**. The RS4 MT employs lower A-arms and adjustable, threaded upper links at each corner of the chassis. The suspension arms resemble RS4 Pro pieces that have been pulled like taffy into off-road pieces; but other parts were lifted directly from the rest of the RS4 line; the rear hubs, front hubs and front hub carriers made the jump to the MT without revision.

The construction of the MT's plastic-body shocks should be familiar to RS4 Sport owners; the same bottom loaded, double O-ring seals are in place, as are the aluminum/plastic top caps.

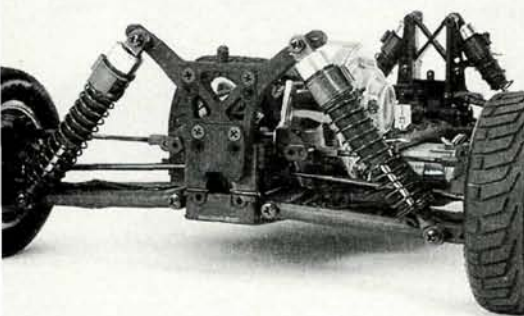
The MT's suspenders are longer than the Sport's shorties, of course, and the rear units incorporate clever, fin-like, "dirt shields" in their spring perches. These shields protect the rear shock shafts from most of the dirt and grit that might otherwise cling to the shaft and harm the seals. Honey-colored mystery oil (it feels like 25- or 30WT) is included to fill the shocks.

New molded shock towers support the dampers. The front unit is integral with the top of the front bulkhead, while the rear unit is bolted to the back of the rear bulkhead. Two sets of mounting holes are provided for the rear tower. When mounted in the lowest position, the suspension is raised for off-road duty, and when the tower is bolted through the upper holes, the truck is lowered for better road manners. The suspension may be further adjusted by selecting any one of three lower shock-mounting positions in each of the suspension arms.

HPI RS4 MT

• **Drive train.** Dual-belt drive systems have worked well on all the RS4s since the Pro, and HPI has carried the formula to the MT. The front and rear diff pulleys use the same bevel-gear internals and diff cases as the Nitro RS4 and the Nitro RS4 Mini. The bigger pulleys deliver a greater final drive ratio—a requirement of the MT's 2.2-inch truck wheels.

Plastic bulkheads hold the diffs on the chassis. The front unit is all new and doubles as the nose of the chassis, while the rear bulkhead uses the same left and right halves as the other RS4s, complete with eccentric diff-bearing mounts to adjust rear belt tension. A plastic support links the left side of the rear bulkhead to a mid-chassis



The rear suspension offers three upper and lower mounting positions for each shock and two shock-tower mounting options; the upper holes (used here) lift the truck, while the lower set helps "slam" the truck for on-road action.

BUILDING & SETUP TIPS

The RS4 MT is probably the easiest to build RS4 of the bunch; the gear diffs

are a no-brainer, and all the parts fit precisely. However, there's always room for improvement!

■ The MT uses roll pins to secure the layshaft pulleys and drive hubs. These are a pain to install! To make it easier to get the pins started, use a pair of pliers to squeeze down one end of the pin, then press it in with pliers or a vise. An old pinion can be used as a spacer so the pin can pass through the axle or layshaft.

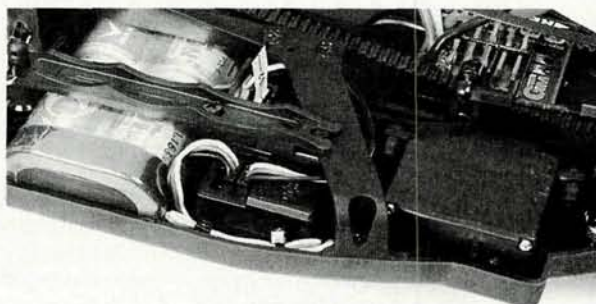
■ Thin bushings are pressed onto the diffs before the drive cups are installed. These must be installed so that the edge of each one is flush with the edge of the boss it is pressed onto. If your thumbs aren't strong enough to do the job, lightly tap the bushing into place with a screwdriver's plastic handle.

■ When you're ready to hit the track, set the wheels with 0-degree camber all around, to take advantage of the V-groove tires' flat tread, then dial in a little negative front camber until you have the handling you like. Courses with sharper turns tend to call for greater camber angles. Increase camber a little at a time, as the flat-top tires are very sensitive to adjustments.

Above: with its brawny, flat-top treads and extra-wide stance, the RS4MT looks firmly planted. Note the narrow shock tower and front bulk-head, the braced hinge pins and the threaded tie rods.



Left: HPI nailed the quick-release battery setup with the first RS4 sedan, and the MT follows with its own swing-away battery door. It snaps into place securely enough, but you can add a body pin for extra security, if you wish. Below: note the battery brace's scalloped top; this piece can be flipped over to take saddle packs, and the scallops help secure the cells. HPI showed foresight by "notching" the chassis for the corner of the servo.



bridge over the battery tunnel, and an aluminum motor plate makes the same trip from the right bulkhead. The belt system's layshaft pierces the motor plate, and there's a slipper clutch on the outboard side and a pair of pulleys to drive the diffs on the inboard side. A final addition is the front belt tensioner, which is adjusted by sliding the tension roller up or down in its slotted mount.

• **Body.** The MT's Ford F-150 body shell and Lexan interior/chassis cover are perhaps its best-known features. Why settle for a merely functional chassis cover when it can double as an imaginative interior with "roll cage" and driver? The exterior shell is pretty neat, too. No one will mistake the bulging hood for scale, but it looks wild

(and allows the hood to envelope the front shock tower). Plenty of stretchy vinyl decals are included to dress up both shells. I have Kevin Meyer's beautifully finished "Concours Corner" body on my truck, but even simple paint schemes look good once the decals have been applied.

• **Wheels and tires.** The MT's bright chrome, 5-spoke rims accept standard 2.2-inch truck tires, so there's no shortage of treads to suit any terrain. The included tires aren't quite a match for the truck's dual-purpose personality, however; the steamroller treads are decidedly "street." The compound is pretty stiff (you can even get away with not gluing the tires to the rims), and foam liners aren't required (or included).



I installed a set of Pro-Line Gladiator tires and RPM Talonz rims for off-road action.

YOU'LL NEED

- Transmitter and steering servo.
- ESC (get one with reverse—more fun).
- Paint for polycarbonate body.
- Battery.
- Charger.

- All-new vehicle concept: 4WD truck.
- Chassis cover doubles as interior.
- Fun to drive—anywhere.
- Accepts stick and saddle packs.

likes

- Roll-pin installation is difficult.
- Poor ventilation for electrics.

dislikes

TEST GEAR

Since the RS4 MT is such an affordable kit (less than \$150 "street" price), it will be attractive to newcomers, and many

will no doubt hit the track with budget-priced electronic gear. With this in mind, I tested the MT with an economical GM* Sport reversing ESC and Futaba's* popular Magnum Junior radio gear with entry-level S3003 servo. However, I wasn't shy about sliding in a serious battery pack (V-Max matched 2000 cells from Team Orion*) and some crazy horsepower (Team Orion Oscar Jansen modified—11x3!).

(Continued on page 200)



GOT GAS? That's where hobbyists' interests increasingly seem to be. No matter what the class of vehicle, rest assured it will soon be infiltrated by the nitro rage! Even open-wheel racers can now go nitro, as OFNA has made a bold move with the release of the F1 nitro racer, which is aimed at the new nitro enthusiast who's looking for a fun car. I'm a casual gasser,*

and this seemed like just what I needed for nitro-powered pavement pounding.

by KEVIN MEYER

OFNA **F1 Nitro Racer**

KIT FEATURES

- **Suspension.** Let's start up front with the steering action—a wishbone suspension (typical F1 style). The fixed upper and lower arms capture the kingpins on which the pan-car-style steering block/axle assemblies ride. The suspension may be tuned by changing the springs under the lower suspension arm. Bent tie rods and ball ends connect the steering blocks to

the included steering servo-saver. The servo is mounted vertical on the chassis and is supported by a special servo brace. This setup will, however, require that you remove the servo's mounting flanges.

The rear suspension consists of a T-bar and a friction damper disk. The T-bar floats on two 3mm O-rings and is connected to the molded battery/fuel-tank support plate. This assembly lies flush

with the front of the chassis. To adjust the rear suspension, turn the nut on the damper post. This is similar to a pan-car-style system minus the rear shock.

- **Drive train.** Unlike the more complex transmissions of most other gas vehicles, the F1's "transmission" is a pan-car-style diff assembly and a solid steel axle. The engine is equipped with a 32-pitch, 13-



FORMULA 1 GOES GAS

tooth clutch bell that meshes with the 50-tooth spur gear. The spur gear holds six steel diff balls, and the diff rings fit over hexes on the diff hubs. The diff is totally adjustable and can easily be rebuilt.

The axle is supported by 5x11mm bearings, and braking is handled by a friction brake pad on a pivoting arm. When the brake is used, the pad applies pressure to the clutch bell. An adjustable brake tensioner allows the brakes to be set for maximum efficiency and helps prevent the pad from dragging on the clutch bell. This eliminates the chance of unnecessarily wearing the pad and straining the drive train.



• **Engine.** The F1 nitro racer is powered by a .12 Force 2-stroke with a pull-starter. There are the usual carb adjustment needles for low end and high end, and there's a third, "mid-range" needle right next to the carburetor venturi. Unfortunately, the kit I received didn't include engine information or instruc-

tions for break-in. According to OFNA, though, all current kits include two pages of instructions.

• **Chassis.** In anodized aluminum, this is divided into two sections:

—front section: carries the steering assembly, front wing and radio gear (receiver and steering servo);
—rear section: is attached to the lower support plate on which the fuel tank and radio battery pack are mounted; the engine sits on top of raised mounting blocks. The multipurpose damper post top plate also serves as a radio tray for the throttle servo.

The combined front and rear sections make a very stout assembly with minimal flex. With the exception of the four engine-mounting screw holes, the bottom screw holes are countersunk. The

OFNA F1 NITRO RACER



s p e c s

Scale 1/10
Price (list/street) \$299.95/\$169

DIMENSIONS

Length overall 16.5 in. (419mm)
Wheelbase 11 in. (280mm)
Width (F/R) 8 in. (203mm)

WEIGHT

Gross, RTR 44 oz.

CHASSIS

Type F1 pan style
Material 1/8-in. 6061 aluminum

DRIVE TRAIN

Type Direct axle
Primary Pinion/spur
Transmission Direct drive
Differential(s) Ball diff
Clutch Centrifugal two-shoe
Bearings/bushings Bushed front wheels; bearings elsewhere

SUSPENSION (F/R)

Type Wishbone style/T-plate
Damping Friction damper

WHEELS

Type (F/R) One-piece, BBS-style

TIRES

Front/rear Slicks

POWERPLANT

Engine Force .12
Pipe Expansion muffler
Carb Rotary

engine-mount holes are not countersunk because they are slots to allow gear-mesh adjustment. The engine-mount screw heads might scrape the surface if you use low-profile tires, so if you change the stock tires and rims, be sure to check ride height.

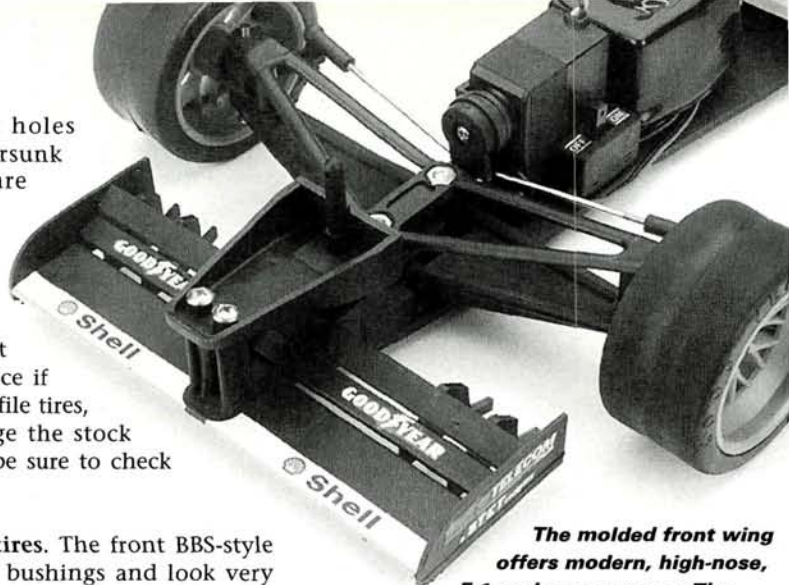
• **Wheels and tires.** The front BBS-style wheels spin on bushings and look very sharp. The included slick rubber tires are, however, too hard to get decent bite unless the surface is very clean and warm, and the supplied foam inserts aren't of much help, as they are too soft to supply enough support. Overall, the tires are good for break-in, but they have a hard time coping with the engine's horsepower when it's time to rock 'n' roll. To compensate, I mounted a set of Pro-Line* F1 Haws on matching Pro-Line wheels, and while I was at it, I added DuraTrax* 5x8mm flanged bearings to the front wheels.

TEST GEAR

- Dynamite* 20-percent-nitro Blue Thunder fuel.
- O.S.* no. 8 glow plug.
- Futaba Magnum Junior transmitter and R122JE receiver. I used Kyosho's* Receiver Dust Cover (part no. 2302KG) to encase my receiver and keep it nice and tidy.
- Futaba S3003 servos.

PERFORMANCE

I subjected my OFNA F1 nitro racer to several test sessions. My biggest problem



The molded front wing offers modern, high-nose, F-1 scale appearance. The receiver—just behind the steering servo—is protected by a Kyosho receiver cover.

was finding a nice, smooth, clean parking lot big enough to let me give it some serious throttle; at top speed, this car covers a lot of ground! After I had run about four tanks full of fuel through the engine for proper break-in, it was time to see what kind of speed this road rocket would be capable of.

The first few runs were rather tame. Not wanting the car to get away from me, I was light on the gas; the engine, however, begged for more throttle, and for that, the car needed more room than my test lot could offer.

I found a larger, smoother and cleaner asphalt lot, and the next run was exciting. I punched the throttle and let it rip. This car is fast, and it *lives* for straightaways! If it were any faster, I'd have to switch to aviation radio gear and clear the runway; it's just that fast. With a little finesse and a modest throttle finger, it will also show some nimble corner work.

BUILDING & SETUP TIPS

■ To increase traction, you'll have to switch to stickier tires; Tamiya* and Pro-Line wheels and tires will fit this model and

give you more traction options (also see "Factory Options").

■ When you remove the flanges on the steering servo, be sure to remove all the excess material so that the case will be smooth and will lie flat on the chassis. This will ensure a smooth steering assembly.

■ To make the diff operate more smoothly, disassemble it and look at the holes the diff balls fit into. If there is a small shoulder around a hole, remove it with a Dremel tool and a grinding wheel; the face of the diff gear should be flush and smooth. After doing this, you'll have a better, larger contact area between the balls and diff rings.

When assembling or rebuilding the diff, apply

diff grease to the balls on one side only, then reassemble it with the lubed side to the inside of the diff assembly. This will help prevent the lubricant from attracting dirt (you'll mostly run the car outside, and a glow engine means grunge); rebuild the diff frequently.

■ Take care when mounting the tires, and then take a minute to make certain the wheels aren't wobbly or lopsided. When they look straight and true, use a high-quality CA such as Pro-Line's Pro-CA (part no. 6000) to glue the tires to the wheels.

■ To guarantee that the engine-mount screws will never vibrate loose, remove them and apply blue Loctite* to their threads. To avoid inadvertently changing the gear mesh, remove and reinstall the screws one at a time.

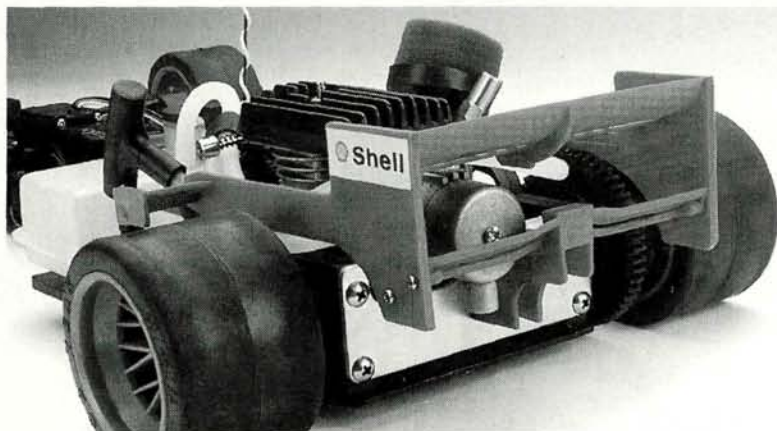
■ For maximum traction when exiting corners, loosen the rear damper nut. Experiment; the tightness of the damper nut is an important tuning tool.

YOU'LL NEED

- 2-channel radio system with two servos and a receiver pack.
- Glow starter.
- Glow plug.
- Fuel suitable for R/C car engine.
- CA to glue tires to wheels.
- Polycarbonate-compatible paint.

FACTORY OPTIONS

- **F1 wheels (F/R):**
White—part nos.—85605/85607.
Black—85606/85608.
- **Tires w/foam inserts (F/R)—85609/85610.**
- **Pair F1 wheels and mounted foam tires (F/R):**
White—85611/85612.
Black—85613/85614.
- **Pair F1 wheels for foam tires (F/R)—tires not included:**
White—85615/85617.
Black—85616/85618.
- **Pair F1 foam tires (F/R)—85619/85620.**



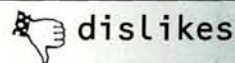
The compact muffler on the OFNA F-10 is designed to release exhaust gas just under the rear wing.

- 90-percent RTR.
- Looks and sounds totally realistic.
- Excellent construction.
- Outrageous speeds.
- Will accept aftermarket rims, tires, bodies, etc.
- Variety of tire choices.



Likes

- Engine-mounting screws aren't countersunk.
- Included slicks are of only limited use.



dislikes

The low-profile cylinder head helps maintain scale appearance while providing adequate cooling for the engine.



FINAL THOUGHTS

Do you like your cars to be fast beyond belief? Do you like F1? Do you like nitro power? If you do, this is your car. Everything about this kit screams "speed," and the 90-percent-built chassis means you'll be out playing sooner.

I wouldn't, however, recommend this as a first nitro kit; 3-needle carb isn't for first-timers. On the other hand, if you've had nitro-power experience—or you have an R/C mentor who does—you'll do fine.

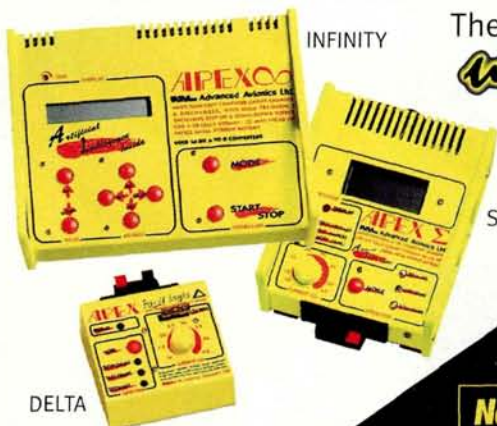
**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

The Power & The Glory

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SIGMA

DELTA



1:5 Scale

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New for '99



Formula 1, the "Kings Class" of Car Racing

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LOSI XX-4

The Top 4-Wheelers

by Staff



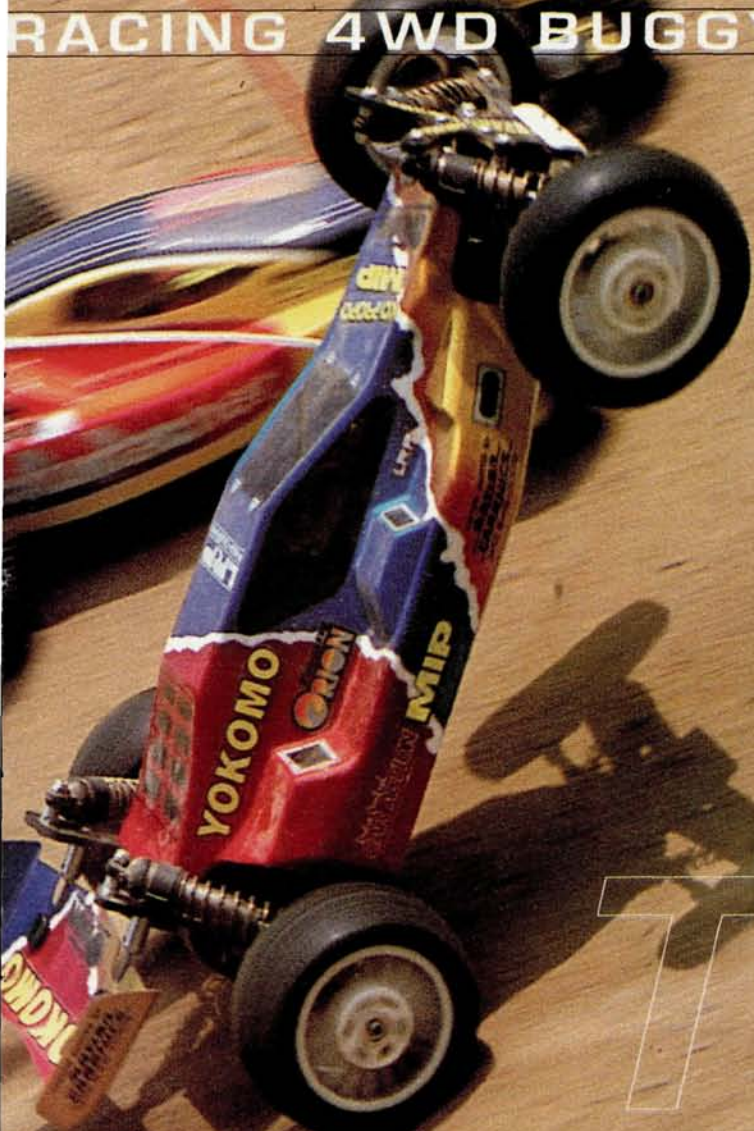
SCHUMACHER CAT '98

Go Head to Head

In any form of racing, certain classes represent the cutting edge of technology and performance. In the full-scale racing world, powerboat racing has its unlimited hydros, auto racing has F1, and the airplane set has its Reno air racers. For fans of electric off-road R/C racing, the 4WD buggy represents the ultimate dirt machine. No truck or 2WD machine can put down the power, carve through turns and fly over jumps like an all-wheel-driver.

Any of the three buggies here can win on any given Sunday: the Team Losi XX-4, the Schumacher CAT '98 and the Yokomo MX-4. Each car represents a particular design philosophy, or a different road to the same destination—victory. The question is: who does it best?

We've included our own unexpurgated comments on each vehicle. In addition, the cars are rated for overall quality, completeness, instructions, ease of assembly, value, maintenance and tunability, and there are breakdowns of each kit's high and low points. A master chart is the final element; all of the critical dimensions, features and tuning options are listed for easy car-to-car comparison. Dive in!



TOP 4WD Head to Head



PHOTOS BY WALTER SIDAS

YOKOMO MX-4

TEAM LOSI XX-4

REAR SUSPENSION

Unlike the front arms, the rear arms use hinge pins at both ends. The clipless inner hinge pins are sandwiched between the chassis plate and the rear bumper to hold them in place. To protect the suspension pivots and chassis from a heavy rear impact, the aft end of the inner pins is supported by a rear hinge-pin brace. The outer end of the suspension arms has extra clearance for the rear hub carriers, allowing subtle changes in wheelbase. The XX-4 offers more rear camber-link mounting options than the other 4WD buggies; there are 11 holes in each side of the bulkhead and five on each hub carrier!



Paint by Bich'n Bodies



GOTTA GET

- Team Losi's stronger, wider green rear belt for modified racing.
- Titanium-coated shock shafts for longevity.
- Team Losi "hot weather" body.
- Motor heat sink.

MOLDED GRAPHITE CHASSIS

The XX-4's chassis is usually a molded composite, but this "fresh-off-the-shelf" model includes the lighter and stronger molded graphite chassis that is normally a factory option. The chassis is further strengthened by the hollow "backbone" which encloses the drive belts and protects them from the elements.

DOUBLE-DISK SLIPPER CLUTCH

The double-disk slipper clutch makes the horsepower of a modified motor more manageable and provides consistent performance throughout a race. The notched slipper disks index to a special spur gear. This configuration doesn't allow for the use of a standard spur gear. An advantage to this design, however, is that the slipper is instantly adjustable from outside the car.

3-BELT SEALED DRIVE TRAIN

The XX-4 includes a 3-belt drive system. There are two reasons why Losi chose this system over the more common, 2-belt design. First, the third belt allowed more flexibility in determining the placement of the motor during the design phase. The second benefit is that larger pulleys can be used. Drive belts tend to favor larger pulleys because they reduce the amount of belt tension required to prevent slippage and reduce the wear and stress on a belt associated with smaller pulleys.

At either end of the enclosed, 3-belt system is a ball differential directing the power to the wheels. The front end also enjoys the benefit of an adjustable, one-way ratcheting assembly (as opposed to a non-adjustable, one-way bearing), making it very easy to adjust the off-power steering response.

UNIVERSAL JOINT DRIVE SHAFTS

Both ends of the XX-4 benefit from the use of universal joint drive shafts. The front drive shafts have the "dog-bone" end on the diff side, with a metal U-joint on the wheel side, while the rears feature an outer U-joint similar in configuration to the outdrive yoke used on the original JR-X2.

FRONT SUSPENSION

The front suspension features a new front shock tower with extra reinforcement, and this makes it stronger than the original design. The inner side of the front suspension arms is attached to the front bulkhead with a conventional 1/8-inch hinge pin that's secured with E-clips. The outside of the arm, where it attaches to the spindle carrier, takes advantage of the security offered by threaded pins fore and aft of the carrier. Four upper and two lower shock-mounting positions afford the XX-4 owner the ability to alter shock angle for varying track conditions.

HARD-ANODIZED CARTRIDGE SHOCKS

Team Losi's hard-anodized shocks are standard on the XX-4. The shock's distinctive design features a seal cartridge at its lower end, making assembly quick and easy. The relative ease of assembly makes consistent re-builds a snap. Two varieties of Teflon shock pistons are included in the kit (no. 56 and no. 57 sizes). The Teflon makes shock operation smoother and extends the life of the piston over other types of composite material. The number used to identify the pistons refers to the size of the holes in the piston, relative to a drill size—the smaller the number, the larger the holes.

WHAT'S HOT

- Adjustable one-way assembly and well-balanced chassis deliver excellent steering response.
- Teflon-sealed ball bearings.
- Enclosed drive system extends the time between rebuilds...

WHAT'S NOT

- ... but the belts and diffs are tough to reach.
- No servo-saver.
- Does not accept "standard" spur gears without a special adapter.
- Difficult to keep motor cool.

PETE SAYS

I found the XX-4 to be the easiest car to drive of the three—with factory settings, the Losi was just plain hooked up. It's one of those cars that is so mellow, it feels as if it must be slow—until the track announcer calls out the lap times. Bonus points for the fully sealed drive train and adjustable one-way "clicker," but be warned; this car runs hot. Losi's optional "hot weather" body and a motor heat sink are wise additions.

GREG SAYS

Our test sample was built box stock, and we didn't alter it in any way. I was amazed by its excellent handling. The car rolled over bumps and jumps like a 2WD car and exhibited all the advantages of a four-wheeler through the turns. The car's fully sealed drive train will please all drivers because of the extended time between rebuilds, but when the time comes to tear down, the XX-4 is more complex to wrench on. Since the car's first release, Losi's revisions to it have upped its durability—no breakage to report here.

STEVE SAYS

The XX-4 out of the box handled the best for my driving style. The front suspension appears to have the best balance of geometry, with 10° of front kick-up and front hub carriers with another 10°, for a total of 20° of caster. Combine the aforementioned caster angle with the adjustable front one-way "clicker," and you have the most aggressive-handling 4WD buggy I've ever tested. The only chink in the XX-4's proverbial armor is that it takes a microsecond longer to get off the starting grid than our other competitors. All told, its performance attributes make the XX-4 my favorite.

MX-4 YOKOMO



Paint by Motion Graphics

SINGLE-DISK SLIPPER CLUTCH

The slipper is fully adjustable, but the knurled adjuster is just about impossible to get at once the transmission has been assembled. However, it only takes a small amount of adjustment to get the slipper properly set up.

MIP CVD DRIVE SHAFTS

Yokomo made it easy on itself and simply placed a call to MIP for a full round of CVDs. Do these drive shafts need any introduction? Strong, smooth and rebuildable—the best.

FRONT SUSPENSION

Thick, boxy suspension arms are a distinguishing feature of the MX-4. No E-clips are used to secure the hinge pins; instead, small screws are installed in the arms to capture the pins. The two-piece fiberglass front shock tower is heavily braced by aluminum standoffs and mounts the shocks on the reverse side of the main shock tower, giving the MX-4 a "snub-nosed" look.

HARD-ANODIZED SHOCKS

New, hard-anodized dampers grace both ends of the MX-4 and feature bottom-loaded seals retained by C-clips. Molded caps with bleed holes keep the oil in, and collars of various thicknesses are used to adjust spring preload.

DUAL-BELT DRIVE TRAIN

A massive, aluminum motor plate anchors the MX-4's dual-belt drive system. A one-way pulley for the front belt is standard equipment, and the ball diffs are quite smooth. New plastic bulkheads keep the rotating parts well concealed; once enclosed by the close-fitting body and undertray, the belts are reasonably protected from dirt and debris.

REAR SUSPENSION

The Yoke's fiberglass, reach-for-the-sky rear shock tower allows for plenty of suspension travel. For increased stability, the slab-like suspension arms reach deeply into the wheels. Oversize pivot balls support the camber links, and the captured hinge-pin system eliminates the need for E-clips.

ADJUSTABLE DOUBLE DECK CHASSIS

The Yoke's main chassis plate is carbon fiber, but the upper-deck components and shock towers are 3mm fiberglass. The three-piece top deck is spring-loaded to tune rear traction and absorb chassis flex, and it also permits the front belt tension to be adjusted. The lower chassis is slotted to accept as many as six cells on the right side of the chassis and three on the left, although the preferred cell layout is not 3x3 but 4x2; no doubt, to compensate for the offset motor position.

GOTTA GET

- Carbon-fiber top deck and shock towers. When your budget allows, lighten up with these optional parts.
- Titanium turnbuckles. Steel turnbuckles are functional, but we breathe easier with titanium units.

WHAT'S HOT

- Adjustable upper deck "shock."
- Tougher than previous Yokomo four-wheelers; nothing broke.
- Excellent dampers.

WHAT'S NOT

- Access for slipper adjustment is difficult.
- Radio space is tight.
- Only accepts Yokomo spur gears; much disassembly is required for replacement.

PETE SAYS

The Yoke felt like the punchiest car of the bunch, which is ironic since it was the heaviest car. I found the MX-4 to be very loose in the turns, at least when I was behind the wheel. Greg and Steve fared better with the car in stock form, but I would need a little more bench time with the MX-4 before I felt confident with it. However, I do like the car. It's built like a tank (in a good way!) and will definitely appeal to fans of the carbon-fiber, plate-chassis esthetic. The body is pretty cool, too; you don't see too many cars with comers any more!

GREG SAYS

The MX-4 handled fairly well on a rough track and took jumps well, landing absolutely level each time without requiring a lot of mid-air attitude adjustment. It's very responsive to throttle commands and has mounds of steering, which allowed me to hug corners tightly. I found the center "shock" useful for altering the balance of traction between the front and rear suspensions. The only drawback to the MX-4 is the amount of prebuilding preparation it needs; the battery trays and chassis slots need to be filed, and several areas need to be relieved to prevent the belts and suspension components from rubbing.

STEVE SAYS

Acceleration is king with the MX-4. From a standing start, the MX-4 pulled better than the other cars. Although the Yokomo is the heaviest by a considerable margin, the lightweight drive train makes throttle response very snappy. The MX-4 uses a conventional one-way bearing for the front end (as opposed to the other cars' ratcheting "clicker" one-ways), and this makes for aggressive off-power steering. On-power steering fades a little, which frequently allowed the Losi buggy to take the tighter line exiting turns. But all-around handling is excellent; the MX-4 will hold its own on most tracks.

SCHUMACHER CAT '98

REAR SUSPENSION

The rear shocks match the relaxed angles of the fronts, but are longer; they extend clear into the rims! A dual-plane shock tower is similar to the front unit. Fiberglass cross-braces and molded arm mounts hold the inboard hinge pins, while the rear hubs provide three degrees of toe-in.

SINGLE-DISK SLIPPER CLUTCH

The single-pad friction slipper uses a lipped pressure plate to prevent the slipper pad from spreading, and it accepts "standard" spur gears.

DOUBLE-DECK CHASSIS

Schumacher's double-deck chassis with "slim" top plate is constructed of non-conductive, S1 composite. There are no braces between the motor mount and the steering bellcranks, and this permits some designed-in torsional flexibility. The clever sidesaddle battery layout gives the CAT more space for electronics than the Losi and Yokomo, and the quick-release battery straps are, arguably, the most user-friendly retention system of the three buggies.

BLADE-TYPE UNIVERSAL JOINT DRIVE SHAFTS

Schumacher's blade-type universal drive shafts are used front and rear. This design isolates the drive pin from the outdrive by enclosing it in a plastic, horseshoe-shaped "blade." It works; the universals are long-wearing and very smooth.

DUAL-BELT DRIVE TRAIN

Dual belts spin front and rear ball differentials. The diffs have no offset, but are instead angled in the chassis; viewed from the top, the belts are noticeably angled when compared to the narrow top plate that runs down the center of the chassis. The pulley for the front belt incorporates a ratchet system to provide the benefits of a one-way bearing without actually using a one-way. Unlike Losi's similar system, the Schumacher setup is non-adjustable.

VOLUME-COMPENSATING CARTRIDGE SHOCKS

The CAT's dampers feature hard-anodized, aluminum bodies with bottom-loaded seals. The seal assembly incorporates a unique volume-compensation system that uses a piece of open-cell foam to store and release shock oil as the shock shaft is compressed and extended. Schumacher's adjustable Vari-shock pistons are standard; they permit each piston to be set with one, two, three, or four open holes. Disassembly of the shock is required, however.

FRONT SUSPENSION

Long suspension arms are joined to a narrow front bulkhead for maximum travel with minimum bump steer. The short shock tower has little material to flex but is heavily braced nonetheless. The severely laid-down shocks are a CAT trademark, and they lend the car considerable cornering ability.

GOTTA GET

- Better turnbuckles. Titanium units are available from Schumacher for extra strength and easier adjustment.
- Aluminum rear arm mounts. The aluminum arm mounts alter toe-in and increase the CAT's durability.

WHAT'S HOT

- Excellent, smooth-track handling with plenty of grip in the turns.
- User-friendly battery quick-release.
- Innovative chassis layout.

WHAT'S NOT

- Instructions could be improved.
- Love-it-or-hate-it body styling. (Pete loves it.)
- Fragile wing mounts.
- Handling skewed toward fast, flat tracks; not as easy to set up for the rough stuff.

PETE SAYS

If your track is fast and relatively smooth, this is your car. In my opinion, nothing can carry speed through a turn like the CAT, and the car is rock-stable when putting the power down on the straights. It turns in hard, however, so keep a light touch on the wheel or dial in some steering expo. The CAT requires some tuning time to set up for rough stuff, but it does work. However, if your track calls for flat landings off big jumps, expect some sketchy, chassis-slapping touchdowns.

GREG SAYS

This car prefers smooth, flat tracks, but the CAT attacked large jumps with authority. The car is very responsive to throttle commands in the air, and this allows you to tweak its landing attitude. The moguls and rutty sections of our test track did tend to throw it around, but regaining control was not a problem. Overall, the car has many interesting design features and is fairly easy to work on. My only two concerns would be the damage-prone rear arm mounts and the wing supports. Optional aluminum rear supports can beef up the rear of the car, but the only fix for the wing supports is a spare set.

STEVE SAYS

The lay-down shock arrangement and the lowest degree of caster out of the bunch make the CAT an excellent flat-track runner with a taste for hard-packed, high-bite surfaces. The lay-down shocks slightly increase the amount of progressive damping in the shocks compared to the more vertical shock-mounting position of the other two cars. Add that the CAT is equipped with zero-degree carriers (all of the caster angle is provided by the kick-up of the front suspension arms), and you have a car that is well-suited to high-speed flat tracks. The CAT is still very capable of handling big bumps, but it feels a little nervous.

HOW WE RATED THEM

COMPLETENESS

Is everything you need in the box? We believe top-shelf racing kits should include full bearings, race-worthy tires, turnbuckles and some type of servo-saver (built in or otherwise).

INSTRUCTIONS

Clarity is everything; crisp illustrations, accurate parts legends and concise text earn high marks.

EASE OF ASSEMBLY

Extensive hand-fitting, scattershot parts and "impossible" assembly steps are no longer acceptable in modern kits. A perfect "10" has logically bagged parts, goes together without a hitch and doesn't require microsurgery skills.

MAINTENANCE

The key questions here are, how often does it need maintenance, and how easy is it to do? Easy parts access and long-lasting settings score high.

PERFORMANCE

Based on our track time with each car, we came up with a number that would sum up each car's turning and jumping prowess and all-around agility. We've included scores for comparison's sake, but our individual comments tell the story most clearly.

QUALITY

This one can be a little nebulous. We're looking for well-molded parts and good material choices, but there's also that tough-to-quantify feel of superior manufacturing.

VALUE

Is it worth the money? The best of everything at a king's ransom is no value; by the same token, bargain pricing on a cut-rate car doesn't help anyone, either. All R/C manufacturers walk a tightrope between price and features, and some do it better than others.

XX-4 CAT '98 MX-4

completeness

8.5

8

9

Of the three buggies, only the MX-4 includes a pinion gear. The Schumacher requires special, long-shank pinions for proper gear alignment, and the XX-4 does not include a servo-saver mechanism.

10

8

9

instructions

ease of assembly

9

8.5

8

You'll need to pay closer attention to the CAT's instructions; they aren't as emphatic or as concise as the others.

The CAT needs very light chassis prep, while the MX-4 requires considerably more time to file the battery lots and retainers (18 slots total!).

7

5

6

maintenance

performance

9

8

8

4WD buggies inherently require more effort to maintain. Although the XX-4's sealed drive train is more difficult to work on, it gets high points because it rarely needs maintenance. The CAT requires more hardware removal for drive-train access than does the MX-4.

These are all great cars, but in stock form, the XX-4 was the best all-around, any-track performer. In its element (fast, flat tracks), the CAT's a "10," but is less composed on bumpy tracks. The MX-4 is a great all-around buggy, but it doesn't have that same confidence-inspiring feel that the XX-4 has.

9

9

9

overall quality

value

9

8

8

As can be expected, these are all high-quality kits.

You get what you pay for; these cars are expensive, but they're the best. However, as a group, they would probably be less expensive if the 4WD class enjoyed the popularity of 2WD.

SPECIFICATIONS

FEATURES	TEAM LOSI XX-4	SCHUMACHER CAT '98	YOKOMO MX-4
Price	\$399.95	\$515	\$499.95
Available at	\$239.99	\$299.99	\$289.99
Wheelbase (mm)	10.6 in. (270mm)	10.8 in. (275mm)	10.8 in. (275mm)
Max. width (mm)	9.8 in. (250mm)	9.8 in. (245mm)	9.8 in. (250mm)
Weight (as tested)	57.4 oz./1,627gm	56.6 oz./1,604gm	61.2 oz./1,736gm
Weight distribution (F/R) as tested (%)	42.5/57.5	41.4/58.6	44.1/55.9
Chassis type	Molded semi-tub	Double-deck plate	Lower plate w/multiple-piece upper deck
Material	Graphite composite	Woven composite	Graphite/fiberglass
Suspension (F/R)	Lower A-arm w/adj. upper link	Lower A-arm w/adj. upper link	Lower A-arm w/adj. upper link
Shocks	Hard-anodized aluminum	Hard-anodized aluminum	Hard-anodized aluminum
Shock towers	Molded composite	Woven composite	Fiberglass
Tie rods	Steel turnbuckles	Steel turnbuckles	Steel turnbuckles
Drive system	Triple belt	Dual belt	Dual belt
Front one-way system	Ratcheting layshaft pulley	Ratcheting layshaft pulley	One-way bearing
Drive shafts	Universal joint dogbones	Blade-type universals	MIP CVD

RATINGS

TUNING OPTIONS

	XX-4	CAT '98	MX-4
No. of inner camber-rod pos. (F/R)	3/11	4/6	4/4
No. of outer camber-rod pos. (F/R)	1/5	1/1	1/1
Adj. wheelbase	yes	yes	yes
No. of Ackerman positions	2	2	2
No. of battery slots	8*	6	9

*Effective battery positions; the Losi XX-4 chassis is not actually slotted, but the molded hold-downs allow each side of the required 3x3 pack to be moved fore and aft one position.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

Nitro race

ROAR

Gas

by
STEVE POND

Off-Road

Nationals



ANY NATIONAL R/C event is certain to offer some great racing, but the excitement and energy level seem to be doubled when the cars in question are nitro-

powered; the sound, smell and smoke of all those

piston-powered cars add another dimension of drama and realism to the competition. And if the cars are duking it out off-road, who can resist! This was just the type of action found at the Freedom Hills



Left to right: pit man Josh Cyril, driver Derek Furutani and team manager/mechanic Orlando Ruiz combined their efforts to win the 1/8 Buggy class at the 1998 ROAR Gas Off-Road Nats.

PHOTOS BY STEVE POND



rs get down 'n' dirty

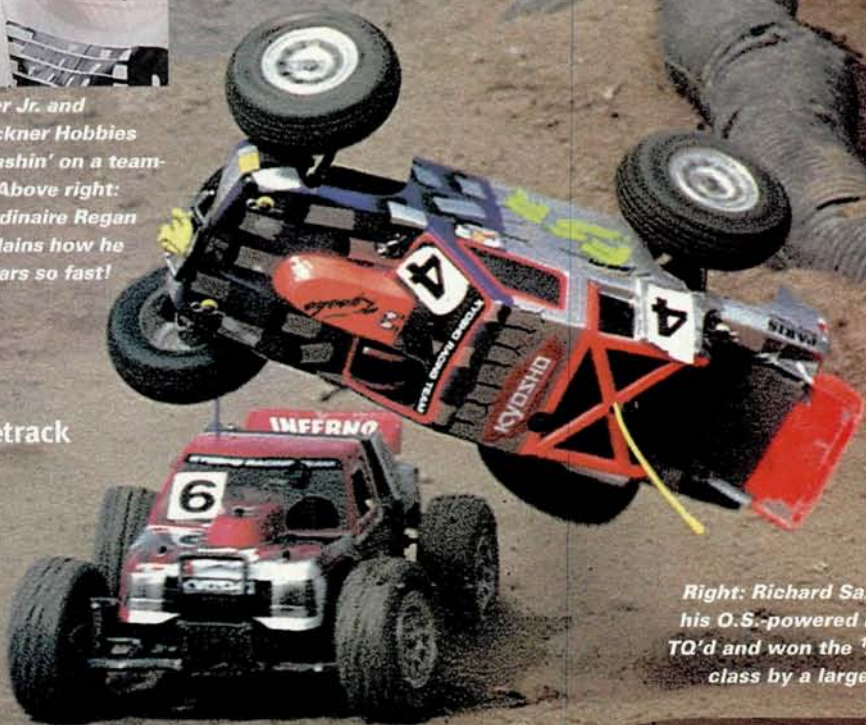


Above: Tom Baffer Jr. and Chester P. of Bruckner Hobbies are seen here thrashin' on a team-mate's RC10 GT. Above right: mechanic extraordinaire Regan LeBlanc (left) explains how he makes Saxton's cars so fast!



R/C Club racetrack in Sterling Heights, MI, the site of this

year's ROAR Gas Off-Road Nationals. This premier off-road facility has played host to numerous national and world championship events. The recent surge in popularity of nitro off-road racing promised to draw some pretty high-level talent to this northern suburb of the "Motor City."



Right: Richard Saxton and his O.S.-powered RC10 GT TO'd and won the 1/10 Truck class by a large margin.





THE TRACK

Freedom Hills is an extremely large off-road racing track that measures just under 740 feet through the driving line and has no less than 25 bumps and jumps. The track's massive size and well-groomed, challenging surface is ideal for nitro-powered racing. It was expected that this event would run as smoothly as other high-profile events hosted by this club in the past, but the earth-churning, nitro-powered buggies were likely to push the club's grooming skills to the limit!

CLASSES

The ROAR Nats included three classes: $\frac{1}{8}$ 4WD buggies, $\frac{1}{10}$ 2WD trucks and $\frac{1}{8}$ 4WD trucks. With 80 entrants, the $\frac{1}{8}$ buggies had the strongest showing. In the ranks of the pro-level drivers, the Kyosho MP-5 and the new Mugen MBX-4 were well represented, and a pair of the new French Laro Diablo D2 buggies came loaded for bear to make their marks on the U.S. racing circuit.

More than 70 entrants filled out the $\frac{1}{10}$ Truck class, which was also heavily attended by pro-level talent. The Associated RC10 GT accounted for the bulk of the entries, followed by the Team Losi GTX.

The $\frac{1}{8}$ Truck class didn't swell to the proportions of the other classes, but it still

managed a respectable 12 entrants. The field was made up entirely of various versions of Kyosho's Inferno ST.

QUALIFYING

Qualifying took place over two days—two rounds each day. IFMAR-style staggered starts were used for 7-minute heats. This gave racers space to run without getting tangled with one another—at least, for a lap or so! At the conclusion of qualifying, one of the four rounds was to be dropped and the qualifying order sorted on the best three rounds. A slight controversy flared on Saturday when it was announced that only two qualifying rounds would be counted, rather than the three previously indicated. But it turned out that ROAR had made the change long before the race, and it was just a little miscommunication that the best three rounds would be counted.

ROAR's point system determines the qualifying order (not the number of laps and elapsed time). This system removes the track conditions from the equation. For example, during the round of qualifying, when the track is in very good condition, it's more likely that racers will turn in the most laps and the fastest times. As the track deteriorates, it becomes harder to turn as many laps. Under the conventional qualifying system, anyone with a poor performance when track conditions were at their best would be unlikely to qualify for the A-main. The point system assigns each racer a score at the conclusion of each round. The fastest driver in that round is awarded zero, the second fastest two points, third gets three points



From right: Gary Cornwell of CVEC, driver Dave Henry and his pit crew at the conclusion of the CVEC Challenge.

CVEC challenge

At the close of qualifying for the Gas Off-Road Nats, Gary Cornwell from CVEC invited 10 of the country's fastest drivers to compete in a 15-lap fun-run to get some hardcore R&D and feedback on the CVEC tuned pipe. To entice the competitors after a long day of qualifying to spend some of their free time at the track, CVEC put 500 bucks up for grabs to the winner.

Each driver was given a CVEC pipe to install on his buggy. Many drivers who participated switched out their race engines to preserve them for the Mains and installed their more expendable backup engines. The racers were given plenty of time to get the engines dialed in with the new pipes before they girded up for the showdown.

The racing was very close. As the race progressed, the idea of some extra spending money settled in, and it was obvious that drivers were making the efforts seen during qualifying. With his Kyosho MP-5, Dave Henry walked away with the loot. Last year's national champion, Doug Von Mosch, finished an expensive fraction of a second behind for second.

"Do the pipes work?" was the question on everyone's mind. Even though the CVEC pipes were not approved for ROAR use, this still proved to be an important test for this pipe. Of the seven competitors who finished the race with a reasonable number of laps, five turned in slightly quicker lap times.

This isn't conclusive evidence as to the pipe's effectiveness, but when drivers all turn faster lap times on virtually the same conditions using backup engines, it tends to raise a few eyebrows!

Nitro rug rats!

Most of us view $\frac{1}{8}$ nitro buggies as top-level racing machines that should be reserved for the most experienced off-road racers. You should earn your proverbial stripes before graduating to the ranks of the big buggies; after all, these things are serious and certainly no place for kids!

Well, so much for that. Seven-year-old Anthony Pocs and his 9-year-old brother, Stephen, from Auburn Hills, MI, were on hand to compete in the nation's largest nitro buggy event. With the tremendous support of their parents, Craig and Nancy, the Pocs brothers set out for the Nationals with rela-

How did they do? They both qualified for the G-main by beating 25 other racers from around the country. Anthony laid down a smoking hot run in the Main to take the first-place trophy, while Stephen (who had engine problems) managed to place fifth.



tively little experience. Anthony had competed in his first race only one week before the Nationals! The elder, Stephen, had a solid month of experience under his belt. The brothers run Paris Picco-powered Kyosho MP-5 $\frac{1}{8}$ buggies with mom and dad as their very enthusiastic pit crew.



Congratulations to the brothers for a job well done, and kudos to their parents/mechanics/sponsors and most avid supporters, Craig and Nancy!



From left: Anthony, Nancy, Craig and Stephen Pocs in their first National event—and only their second race!

and so on. The drivers are awarded points according to their finishing positions for that round, and instead of averaging the drivers' times, the points are totaled to determine qualifying order, and a slower first-place finish in one round is equal in points to a faster first-place finish in another. The driver with the fewest points is the top qualifier (TQ).

The qualifying started on Friday in weather cooler than a typical Detroit summer day. A freshly groomed track combined with the cooler air that nitro engines love made a very interesting first day. Many of the 1/10 trucks pulled wheelies down the long back straights and carried their front wheels in the air until the drivers let off the throttle! The fast speeds of the first round were not expected to be beaten in

the second round, as the traction was steadily wearing away, and this slowed the cars down slightly. Before round two got under way, however, nature let loose with a downpour of rain that was enough to keep the track well watered but not enough to "puddle."

The lap times in the second round were actually faster!

On Saturday the last two rounds of qualifying took place, which were shuffled to group the drivers by their first- and second-round efforts.

This regrouping more closely matched the speed and driving skills of the drivers, and that set the stage for a preview of the A-mains.

Richard Saxton already had a strong hold on the TQ spot in 1/8 Buggy with first and second places. He cemented his TQ spot by grabbing another first with

his Paris Picco-powered Mugen MBX-4. Matt Ledger, driving a Rex-powered MBX-4, moved up seven spots to take second. Mark Pavidis, driving a NovaRossi-powered MBX-4, rose from the ashes of a poor first-day effort and nailed the last two qualifiers to round out the top three spots on the grid for 1/8 Buggy.

Mark Pavidis, running his O.S.-powered Associated RC10 GT, enjoyed the same spoils as Saxton in 1/8 Buggy and entered the second day of qualifying with first and second places already under his belt. "King" Richard (Saxton) had other plans, however. Recovering from a disastrous first day with a DQ (disqualification) for not having a transponder, the king cranked out two first-place finishes and took top honors with his O.S.-powered RC10 GT. Pavidis held on to second, while Greg Degani, with his O.S.-powered RC10 GT, jumped up four spots to edge out Billy Easton for third.

Tim Long, driving an FTD-prepared Kyosho MP-5 with Rex power, was passed for the TQ spot in 1/8 Truck by Dave Henry, who drove an identical



W i n n e r s

1/8 Buggy

Fin.	Qual.	Driver	Chassis	Engine	Pipe	Fuel	Radio	Tires
1	10	Derek Furutani	Laro Diablo D2	O'Donnell Top	Top	O'Donnell 30%	Airtronics M8	Pro-Line 9011 M2
2	5	Dave Henry	Kyosho MP-5	O.S. RZ-B	Paris AL650	O'Donnell 20%	Futaba 3PJ	Pro-Line 9011 M2
3	4	Chris Walrod	Kyosho MP-5	O.S. RZ-B	Paris AL650	O'Donnell 20%	Airtronics M8	Pro-Line 9011 M2
4	9	Tim Long	Kyosho MP-5	Rex SBK	Paris AL650	FSR 30%	Sanwa	Pro-Line 9011 M2
5	6	Kris Moore	Kyosho MP-5	Paris Picco P21	Paris AL650	O'Donnell 20%	KO Propo Mars	Pro-Line 9011 M2
6	8	Chad Bradley	Kyosho MP-5	Paris Picco P21	Paris AL650	O'Donnell 20%	Hitec	Pro-Line 9011 M2
7	2	Matt Ledger	Mugen MBX-4	Rex SBK	Rex	Dynamite 30%	JR R-1	Pro-Line 9011 XTR
8	7	Doug Von Mosch	Mugen MBX-4	Rex	Mugen B54	O'Donnell 30%	Airtronics M8	Pro-Line 9011 M2
9	3	Mark Pavidis	Mugen MBX-4	NovaRossi	Rex	O'Donnell 30%	Airtronics M8	Pro-Line 9011 XTR
10	1	Richard Saxton	Mugen MBX-4	Paris Picco P21	Mugen B54	Blue Thunder 30%	JR R-1	Pro-Line 9011 M2

1/10 Truck

1	1	Richard Saxton	RC10 GT	O.S. 12 CV	Associated	Blue Thunder 20%	JR R-1	Pro-Line Edge M2/Bowtie M3
2	9	Doug Von Mosch	RC10 GT	O.S. 12 CZ-Z	Associated	O'Donnell 20%	Airtronics M8	Pro-Line Edge M2/Bowtie M3
3	8	Matt Francis	Team Losi GTX	O.S. 12 CV	O'Donnell	O'Donnell 20%	Airtronics M8	Losi Gold/Pro-Line Bowtie M3
4	10	Chad Bradley	RC10 GT	O.S. 12 CV	Associated	O'Donnell 20%	Hitec	Pro-Line Edge M2/Bowtie M3
5	2	Mark Pavidis	RC10 GT	O.S. 12 CV	Associated	O'Donnell 20%	Airtronics M8	Pro-Line Edge M2/Bowtie M3
6	7	Matt Ledger	RC10 GT	O.S. 12 CV	Associated	Blue Thunder 20%	JR R-1	Pro-Line Edge M2/Bowtie M3
7	4	Billy Easton	RC10 GT	O.S. 12 CZ-Z	Associated	O'Donnell 20%	Airtronics M8	Pro-Line Edge M2/Holeshot M3
8	5	Bryce Beaver	RC10 GT	O.S. 12 CZ-Z	Associated	O'Donnell 20%	Airtronics M8	Pro-Line Edge M2/Bowtie M3
9	6	Jimmy Jacobsen	RC10 GT	O.S. 12 CZ-Z	Associated	O'Donnell 20%	Airtronics M8	Pro-Line Edge M2/Bowtie M3
10	3	Greg Degani	RC10 GT	O.S. 12 CV	Associated	O'Donnell 10%	Futaba 3PJ	Pro-Line Edge M2/Bowtie M3

1/8 Truck

1	1	Dave Henry	Kyosho MP-5	O.S. RZ-B	Paris AL650	O'Donnell 20%	Futaba 3PJ	Kyosho
2	2	Tim Long	Kyosho MP-5	Rex SPK	Paris AL650	FSR 30%	Sanwa	Kyosho
3	4	Peter Head	Kyosho MP-5	Paris Picco	Paris AL650	FSR 30%	KO Propo Mars	Kyosho
4	5	Greg Waller	Kyosho MP-5	Top	Top	O'Donnell 30%	Airtronics M8	Kyosho
5	6	Edward Wong	Kyosho MP-5	O.S. RZ-B	Kyosho	FSR 30%	KO Propo Mars	Kyosho
6	3	Tyrone Wright	Inferno	O.S. RG-B	O.S.	O'Donnell 20%	Futaba 3PJ	Kyosho
7	7	Ron Brott	Inferno	Rossi	Rossi	Byron Race 20%	JR Racing 756 PCM	Kyosho
8	9	Jeff Salyer	TT V-Spec	Thunder Tiger	Thunder Tiger	O'Donnell 20%	Futaba Magnum Junior	Kyosho
9	10	Josh Handrosh	Mugen SA	OFNA 6 port	CVEC	FSR 20%	JR Racing 756 PCM	Kyosho
10	8	Brian Turner	Kyosho MP-5	O.S. RG	O.S. T2020	O'Donnell 20%	Futaba 3PJ	Kyosho

A race of this magnitude usually brings the factory teams out with all their latest and greatest equipment. These highly competitive events give them a chance to test the newest prototype and production car and parts against those of their

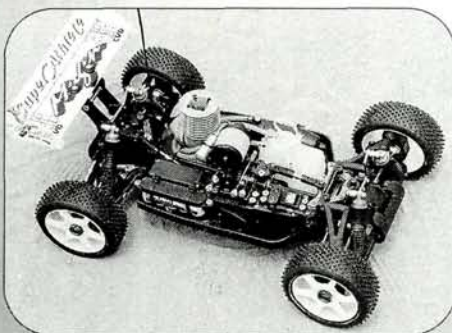
New in the pits

closest rivals. Here are most of the latest products showcased at the 1998 ROAR Gas Off-Road Nats. Some will soon be available; others won't be; but this will give you valuable insight into what's happening in the world of nitro off-road racing.

■ Mugen

This was the first "en masse" appearance of the new MBX-4 from Mugen. This new design shares very few of its components from the previous model, and based on its performance, it looks as if it will be a contender.

Notable features include suspension arms with a canted hinge-pin angle, repositioned engine and fuel-tank mounts, easy-access differentials, metal disk brakes and a stiffer chassis.



■ Kyosho

The Kyosho team showed up with what will end up being a conversion kit for the MP-5; this new kit includes components to make the car 6mm longer and 6mm wider. If the hands-down fastest lap time of the event

turned in by Kris Moore and his MP-5 is any indication, the conversion kit definitely ups the performance of Kyosho's top buggy.

■ Pro-Line

"Domination" is the word that comes to mind when I consider tires for the 1/8 buggies. In the past, the original manufacturers of the kits were the only sources of replacement tires. Pro-Line now offers the M2- and XTR-compound 9011 tire for 1/8 buggies. Take a look at the A-main chart for the 1/8 buggies; they all used these new tires.



■ MIP

If any aftermarket accessory was used on almost every car and truck at this race, it was MIP's CVD drive shaft. MIP makes CVDs for most of the popular 1/8 buggies and 1/10 trucks. Many of the 1/8 buggies also used MIP's Hard Body, anodized, Teflon-coated shocks.

Kyosho truck with O.S. power. Long hung on to second, while Tyrone Wright piloted his O.S.-powered Kyosho Inferno truck into third.

THE MAINS

All that was left for Sunday were the Mains. Each class included eight racers, and the first- and second-place finishers

were able to bump up to the next Main to round out the field with 10 competitors. Sunday was sunny and warmer—more comfortable for spectators—but the

WE'VE PUT THE STAI



When you're ready to fire up your on-road gas racer, fire up your computer first. Log onto the Team Serpent Network web site and check out our ever-expanding gas track directory, complete U.S. and world-wide racing calendars, track photos, contact numbers, maps and much more – total info for all the on-road nitro action in your area and beyond. Start your modem. Then, gentleman, start your engine.

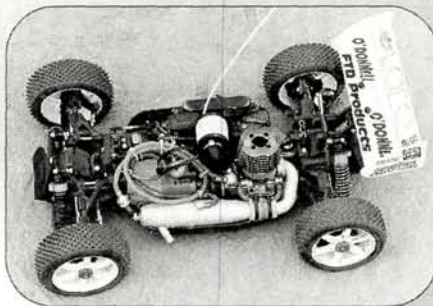


E-mail: Serpent USA, Inc.: serp-usa@ix.netcom.com

Serpent b.v., The Netherlands: team@serpent.nl

■ Laro

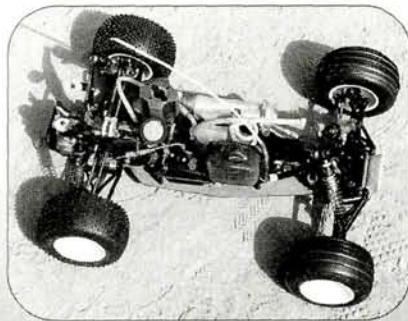
The new D2 Diablo made its racing debut at the Gas Nats, and although it was heavily outnumbered, it came away with the win! The D2 features a pretty big list of innovations that combine rugged buggy technology with that of the nimble on-road gas cars. The lower suspension arms are attached to the chassis with free-moving pivot balls, as opposed to the conventional hinge pins found on most cars in this class. The D2 also permits adjustment of the rear toe angle with a pair of turnbuckles. The off-road features include modified pivot angles on the lower suspension arms and eight degrees of kick-up in the chassis plate for better bump handling.



■ A-Main Racing

A-Main Racing came to the Nats with a little-known chassis conversion for the RC10 GT. It replaces the flex-prone stock chassis with a very rigid double-deck backbone. In addition to the performance advantages that this should provide, the chassis' open design makes it easier to install and maintain your hardware.

The addresses of the companies featured here are listed alphabetically in the Index of Manufacturers on page 209.



change in weather required some tweaking of engines for maximum performance.

Racers in the lower Mains (15 minutes long for all except the B-main, which was

30 minutes long) were the first to take advantage of the freshly groomed track. They finished in the early afternoon and set the stage for the A-mains.

• **1/8 Truck.** Kyosho driver Dave Henry led right from the TQ spot on the starting grid and held the number-one spot for the 20-minute abbreviated Main. The only other car to finish on the lead lap was Tim Long's Rex-powered MP-5. Long kept Henry in his sights from the number-four qualifying position. Long took advantage of mistakes by Tim Head and Greg Waller to secure second, but he couldn't reel in the now cautious Henry. Long crossed the finish line less than 8 seconds behind Henry. Peter Head got by Waller, running in third, for the final podium spot.

• **1/10 Truck.** Last year's 1/8 Buggy national champion, Doug Von Mosch, bumped up to the A-main with a wire-to-wire win in the "B." He was joined by Chad Bradley, who pulled off a late pass for the final bump spot.

Richard Saxton dropped the hammer from the starting buzzer and never looked back. On his second trip around, Saxton clocked a 33-second lap that rivaled those of many of the 1/8 buggies! During the early running, Mark

TING LINE, ON-LINE.



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Serpent
EXCITEMENT IN THE FAST LANE

Pavidis was in tow in the second spot, but he steadily lost a second a lap to the rock-solid Paxton. A little more than a third of the way through the race, Pavidis had problems and gave up second to the hard-charging Von Mosch. Pavidis, now sidelined, fell back to eight, which opened the door for Matt Francis, who piloted an O.S.-powered Team Losi GTX. Francis worked his way up from the eighth starting position and settled into third behind Von Mosch, and that's the way they finished; a lap separated each of the top three.

• **1/8 Buggy.** This grand finale was headed by Saxton. With his dominant performance in 1/10 Truck and a TQ starting spot for the nitro buggies, chances looked good that he would pull the double/double (TQ and win in both classes). But Saxton and the rest of the field had not counted on the Laro "Double Devil" piloted by Derek Furutani. Furutani bumped up to the A-main with a nail-biting last-lap pass in the B-main to secure the final bump spot.

Saxton pulled away from the starting grid and looked to be positioned to take a commanding lead. Only four laps into the

Main, Saxton's rear diff self-destructed, and he was forced to retire. Mark Pavidis had the lead for one lap before losing it to the ballistic Kris Moore. Moore chimed in with the fastest lap of the entire weekend at 31.8 seconds, and he looked tough to catch. His five laps in the lead ended, however, when he flamed out and was sent to the pits. He was able to re-fire but could not recover.

Mark Pavidis picked up the lead and held it for 24 laps until he was sidelined with his own mechanical problems. Canadian Dave Henry took the lead on lap 36 and ran a strong 22 laps in front. Nobody noticed that during all this action, Derek Furutani had managed to work his way up from the last spot on the starting grid and was closing in. Quick pit work and steady driving allowed him to sneak by Kyosho's Chris Walrod and into second, and that set the stage for the most incredibly close racing I've seen in years.

On lap 58, Furutani passed Henry to take the lead. Over the next five laps, they swapped the lead back and forth at least five times. An untimely flip on the front straight by Furutani gave Henry some breathing room, but it was short-

lived. Only a few laps later, Henry returned the favor with a little flip of his own. With only a few minutes left, Henry pressed hard to make up lost ground, and Furutani was in good shape with a lead strong enough to coast home for the finish. But the race was far from over: Savon Hobbies team manager Orlando Ruiz determined that Furutani wouldn't be able to make the finish without going in for more fuel. Some street smarts from teammate Josh Cyril kept Furutani out on the track as long as he could to force Henry to push harder. Cyril's advice paid off, as Henry pushed too hard and got onto his lid long enough for Furutani to take a quick splash and go, and ultimately take the win!

This win is a first in a few ways: it's Furutani's first national championship and Laro's first win in the U.S.—in their first outing!

Congratulations to all participants of the 1998 ROAR Gas Off-Road Nationals, especially the winners. Kudos also to the Freedom Hills R/C Club for a spectacular event. It was one of the most exciting gas races I've attended in a long time. ■



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Project

TRAXXAS MEGA MODS FOR

When it comes to sheer popularity, Traxxas' Rustler trucks are runaway hits. These durable, easy-to-build (or prebuilt, if you like) machines have been highly recommended for first-timers since their inception, and they continue to be the trucks of choice for enthusiasts and beginners alike. In response to many requests for hop-up and tuning info, we decided to give both the Rustler and Nitro Rustler the "Project" treatment—lots of trick, upgrade parts (part numbers will follow each description) and plenty of track tuning. You certainly don't need to go as crazy as we did to have a lot of fun with the Rustlers (or to go racing with them), but these super-trucks should definitely inspire you!

SETUP

FRONT SUSPENSION

RIDE HEIGHT: arms slightly above level
CAMBER: -1 degree
TOE-IN/OUT: 0
LOWER SHOCK LOCATION: outside hole

SHOCKS

OIL: 45WT
PISTON: 2-hole
SPRING: Losi pink
LIMITERS: none

REAR SUSPENSION

RIDE HEIGHT: axles slightly above level
CAMBER: -1 degree
CAMBER LINK: lower hole
HUB CARRIER: upper hole
LOWER SHOCK LOCATION: second to last hole outside

REAR SHOCKS

OIL: 45WT
PISTON: 2-hole
SPRING: Losi yellow
LIMITERS: 1/16 spacer

TIRES

FRONT: Pro-Line Edge M3
REAR: Pro-Line Square Fuzzy M3

OTHER

Traxxas LS-II body (2511)
Trinity TA03 hex hubs
(drilled to fit; front only)

ELECTRIC RUSTLER

Just about all you'll need to make the Rustler competitive is a full set of bearings, a ball diff, a slipper clutch and appropriate tires for your track conditions. These items can transform your backyard basher into a racing truck with real potential.



Trinity anodized hardware

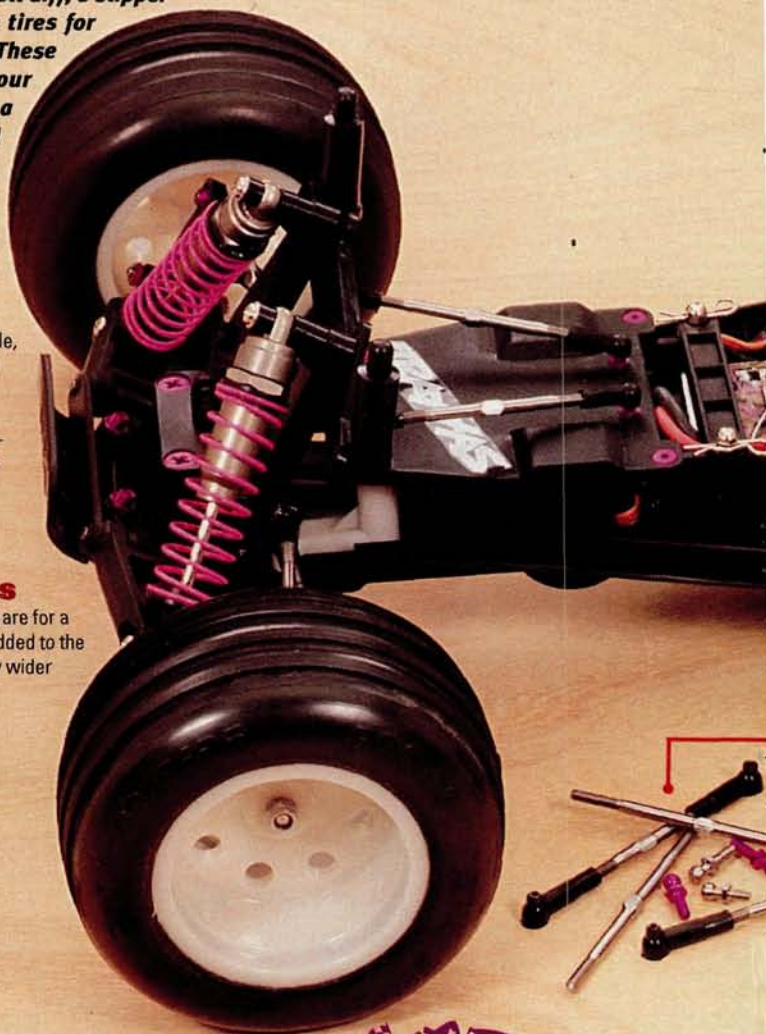
If you're decking out any vehicle, you've just gotta add anodized hardware. Trinity's* purple screws (screw box—part no. 6067), nuts (4-40 mini locknut—EV1043) and ball ends spice up the look of any chassis.



Trinity hex hubs

These Trinity hex hubs (TA 108) are for a Tamiya TA03 sedan but were added to the front of the Rustler for a slightly wider stance and greater stability.

PHOTOS BY WALTER SIOAS



Traxxas Big Bore shocks

I replaced the stock, plastic-body shocks with hard-anodized, aluminum Big Bore shocks from Traxxas. The stock units work well, but for super-smooth operation and long life, the aluminum upgrades are the way to go (long—2660, XX long—2662).

FINISHING TOUCHES

Pro-Line* Edge front and Square fuzzy rear tires kept the truck planted on the track. An LS-II body painted by Scott Bich of Bich'n Bodies* gave the truck a sleek race look.

In the electronics department, I used my JR

Racing* R-756 radio with a JR 4735 steering servo. A Novak* Mercury receiver took in the signals, and a Cyclone ESC helped regulate throttle control. I selected a Trinity 2000mAh stick pack and a Midnight 2 motor for power.

RUSTLERS

A POPULAR PAIR

by GREG VOGEL

KEY

- PERFORMANCE
- DURABILITY
- APPEARANCE

Relieved upper deck

While the Dremel was in hand, I relieved some material on the upper deck to reduce weight (and to make it look cool). I also cut off the mounting posts for the standard mechanical speed control from the rear battery retainer to conserve weight.



Machined transmission gears

I replaced the internal gears with Traxxas' machined upgrades. Unless your gearbox is very new, don't replace individual gears; drop in a whole set for optimum mesh and efficiency (aluminum idler gear—1996X, Delrin gear—3195X).

Trinity heat sink

The Rustler does not have an aluminum motor plate to help dissipate heat, so I did a little creative hacking with my Dremel tool and removed some of the plastic above the motor to allow me to slip on a Trinity purple-anodized, aluminum heat sink (TA 110).

Traxxas ball differential

The stock planetary gear diff is extremely rugged and can take tons of abuse, but the ball diff (2520) will help the car hook up better through the turns (especially the tight ones) and stabilize the power transfer from the wheels to the track.

Robinson, Lunsford, MIP linkages

The stock camber and steering links were swapped with a full set of Lunsford* titanium tie rods fitted with Robinson Racing* (RRP 2012) and Associated* ball cups that snapped over a full set of MIP BJ ball studs (1075, 1076). The Robinson cups remove a lot of slop from the linkages but can't be used on the entire truck due to narrow clearances on the inside of the front and rear upper links. I also used two adjustable turnbuckles to increase the rigidity of the front shock tower.

Traxxas ball bearings

Ball bearings top the hop-up list of any vehicle, since they reduce power losses due to friction and extend the life of drive components. A full set of ball bearings (4608) was added to the transmission, the front wheels and the steering bellcranks for smoother operation.

Slipper clutch

Without a slipper clutch, the transmission is heavily stressed when landing off jumps and tackling rough terrain. Traxxas' optional slipper (4615) will maximize traction on "loose" surfaces and protect the gears from possible damage under extreme loads.

MIP CVDs and RMR CVD boots

MIP's* "shiny" CVD axles (1219, not shown) replaced the stock slider units to eliminate backlash, and the plated finish earns style points. They're also rebuildable, so you save money in the long run. You can extend time between rebuilds with CVD boots by RMR Technologies*; they help prevent dirt from entering the joint.

TRACK TESTING

It seems that every time I have to test a car, R/C Madness track owner Chris Marcy immediately schedules a Supercross event. Marcy piles up the dirt to make waist-high jumps, cavernous berms and steep drop-offs around the enormous track for a big-air blowout; much fun, and a great test for my race-fortified Rustlers.

The Electric Rustler handled the rough terrain and nosebleed jumps well, but I found it was tricky to put the power down on landing; when it touched down after a big-air freefall, it slapped hard and popped the nose up. Then I had to let off and allow the truck to settle before I could get back on the gas. On anything smaller than the monster Supercross jumps, the Rustler probably would have been dialed. For this track, however, I should have used heavier shock oil.

NITRO RUSTLER

I had finished the Electric Rustler first and was extremely anxious to begin working on the nitro version. I pulled out the Nitro Rustler that I used in my Thrash Test (September 1997) and set to work; believe me, it was, indeed, "thrashed"!

Electronic gear and fuel

For electronics, I bolted in two Hitec* 525BB servos and my Airtronics* M8 radio gear. A Dynamite* pack powered the electrics, and Byron* 20-percent fuel filled the tank.



Traxxas 25-degree caster blocks

The stock front caster blocks were replaced with 25-degree units to improve the truck's steering geometry for more aggressive handling (2634).



Traxxas E-clip hinge pins

I picked up a full set of hinge pins (1939) from Traxxas to replace the stock screw-pin types. Trinity offers a blue-anodized, aluminum brace (TK3021) with hinge pins to stiffen up the front bulkhead.

SETUP

FRONT SUSPENSION

RIDE HEIGHT: arms slightly above level

CAMBER: -1 degree

TOE-IN/OUT: 0

LOWER SHOCK LOCATION: outside

FRONT SHOCKS

OIL: 30WT

PISTON: 2-hole

SPRING: Losi pink

LIMITERS: none

REAR SUSPENSION

RIDE HEIGHT: axles slightly above level

CAMBER: -1 degree

CAMBER LINK: stock position

HUB CARRIER: lower hole

UPPER SHOCK LOCATION: inside hole

REAR SHOCKS

OIL: 35WT

PISTON: 2-hole

SPRING: Losi yellow

LIMITERS: stock plus one O-ring

TIRES

FRONT: Pro-Line Edge

REAR: Pro-Line Mini Pins

POWERPLANT

I was prepared to buy some new parts to freshen up the Nitro Rustler's engine, but I decided simply to replace the whole thing; Traxxas made it worth my while. Thanks to their Lifetime Engine Replacement Policy, you can return your used .11 to .15 Traxxas engine** (directly to Traxxas or through an authorized dealer) and get a new TRX Pro .15 for only \$70. I didn't need to be told twice—off my engine went to the factory. When the new Pro .15 arrived, I removed the

Traxxas graphite upper deck

Instead of mounting the steering on the existing upper plate, I opted to use a lightweight, yet stronger, graphite plate. The plate comes with all of the necessary hardware to make the conversion, and from an aesthetic standpoint alone, is well worth a few extra dollars (graphite chassis set—4442X).



Factory Team tie rods

Hmm ... blue brace, blue heat-sink head—it seemed only fitting to use blue titanium tie rods. Team Associated recognizes the popularity of Traxxas vehicles and now offers a set for the truck as part of its Factory Team line.



Associated blue-anodized hardware

Team Associated will also be offering a set of Factory Team blue-anodized, aluminum screws for the Nitro Rustler. All of the blue material on the truck definitely makes it a winner in the glamour category.

pull-start and added a butt-sink (4012) and tuned pipe (4485) from Traxxas. The blue-anodized pipe is a perfect replacement for the stocker. If you're after convenience instead of ultimate performance, a Traxxas EZ-Start can be added to allow push-button electric starting.

**** (Editor's note: Traxxas will accept any brand of .11 to .15 engine and replace it with a TRX Pro .15 with pull-start for \$80 through October 31, 1998. See your hobby dealer or contact Traxxas for details.)**



Pro-Line tires

A set of Edge tires was selected for the front, and a pair of Mini Pins laid down the traction in the rear.



Traxxas fiberglass front and graphite rear shock towers

While I had the truck apart, I slipped on a new fiberglass front shock tower (a graphite version should be available by press time). The more rigid tower should eliminate any unwanted flex. The graphite rear version is now available and is a definite "must-have." This new shock tower allows you to mount a 5-cell flat pack to its back to power the electronics. This moves the weight closer inboard and improves handling. I replaced the Traxxas plate with a rear battery plate from an Associated gas truck; I just had to drill a little to make it fit.



Traxxas ball diff and machined gears

In the rear of the car, I replaced the planetary gear diff with Traxxas' upgraded ball diff (4420) and matched up the rest of the tranny with a precision-machined idler gear (4196) and upper shaft with gear (4493). Shown here is the up-graded Delrin planetary gear diff and optional spur (4472) and clutch bell (4118).



Traxxas 3-stage air filter

Air filters are taken for granted. Just stick one on to prevent dirt from going into the engine, right? Well, yes; but you also want the maximum amount of air to flow through without restriction. Traxxas' 3-stage filter sponges (4063) hold back dirt and debris while allowing the air to flow through unrestricted.



Traxxas ball bearings

Bearings. I shouldn't have to say any more; they should be the first hop-up you buy for the car. They reduce friction and increase the speed and longevity of your truck (5x8 ball bearings—2728, 5x10—4609).



RMR CVD boots

RMR Technologies CVD boots were used on the MIP CVDs (1217, not shown) to repel dirt and extend the time between rebuilds.



Traxxas Big Bore shocks

A full set of hard-anodized, aluminum shocks replaced the plastic stockers for longevity and smooth damping of the suspension (long—2660, XX long—2662).

TRACK TESTING

The Nitro Rustler was also subjected to a Supercross torture session, and it took to the track with aplomb—it was closer to the ideal setup—and performed impressively. The lightened truck had loads of acceleration, the suspension soaked up all the air time I could throw at it, and the steering was very precise. The TRX-Pro .15 ran reliably after break-in and didn't have to work as hard as smaller engines to deliver white-knuckle speeds, thanks to its large displacement.

FINAL THOUGHTS

I had a lot of fun building these super-Rustlers, but don't get the wrong idea; you don't need all the hop-ups I added to noticeably increase performance or race competitively. Stock Electric and Nitro Rustlers benefit greatly from ball bearings and a set of good tires matched to the track (ask around the pits to see what the hot setup is). Electric Rustler owners should definitely go for the slipper clutch

as well. From there, the biggest performance gains come from tuning. Take the time to get the shock oil weights, spring rates, gearing and motor wind (or engine setting) choices right, and a relatively stock Rustler can run with the steroid-pumped trucks shown on these pages; it just won't look quite as trick!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

GET UP TO SPEED WITH ...

- 129** INNOVATOR AT WORK • Protoform's Dale Epp
- 130** SPEED SHOP • OFNA's Heavy Duty Hex Wrenches; Kimbrough carbon-fiber pinion gears; Team Associated's new RC12L3; RPM Ride Height Gauge
- 131** RACER PROFILE • Team Associated driver Frank Polimeda
- 132** RACER TIP OF THE MONTH • Team Trinity factory driver Joel "Magic Man" Johnson on steering servo placement
- 134** MINI RACE COVERAGE • 6th Annual Moter Man Challenge

No matter which type of racing you're into, you've probably had—or currently race with—a Protoform body mounted on your car. Protoform racing bodies have helped many drivers win a wide variety of national and world championships. Well, it just so happens that Protoform's Dale Epp is this month's "Innovator at Work," so here's your chance to find out more about the man behind the molds—a visionary Lexan body sculptor.

Looking for the latest in racing-oriented hardware? You'll find some innovative new products from

OFNA, Kimbrough and RPM in our "Speed Shop," along with Associated's latest take on topnotch 1/12 racing technology, the RC12L3.

Speaking of the A-Team, Team Associated driver Frank Polimeda, considered by many to be the king of the circle track, is the subject of this month's "Racer Profile." Polimeda played an important role in the design of Team Associated's latest oval contender, the RC10L30, and he offers some words of wisdom for all of you speed freaks out there!

Dale Epp

INNOVATOR AT WORK

Dale Epp started Protoform in early 1992, shortly after stumbling across a copy of *Radio Control Car Action*. He read the magazine from cover to cover and was amazed at how sophisticated and exciting our hobby is. From that moment on, Dale made a commitment to become involved in R/C, and he subsequently jumped—hook, line and sinker—into the Lexan body manufacturing industry; the rest is history. In this interview, Dale looks back at Protoform's early days and shares some insights into the company's future.

Radio Control Car Action: You're a very talented body sculptor. Where did you develop your sculpting talents? Were you an artist before you became involved with R/C cars?

Dale Epp: It's tough to put my finger on when and where my sculpting talents really developed. My fascination with automotive design started when I was 6 years old. I used to read my older brother's "Rod and Custom" magazines and shortly after, I started building model cars. The funny thing is, I just couldn't leave things as they were; I had to customize everything—including my bicycle. A few years later, I started racing slot cars and got my kicks building brass- and piano-wire chassis as well as painting bodies. It was about this time that I started to intensely follow full-size racing in almost any form.

It was the era when a few very clever designers, such as the late Colin Chapman [Team Lotus F1], discovered aerodynamics and opened an exciting new frontier in the world of auto racing. Soon, inverted wings started to show up on cars, and racecars started to evolve quite radically almost weekly. A few of my heroes back then were Jim Hall of CanAm, Chaparral and Indy fame, Craig Breedlove [Spirit of America land-speed record-holder] and the late Mickey Thompson, who built cars for Bonneville, Indy and drag racing. What intrigued me the most about these hotrod pioneers was the striking beauty of their machines. They were not only fast, but they also looked fast when standing still.

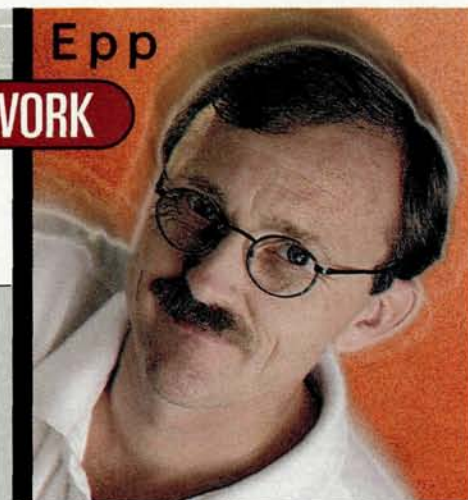
When I was finally old enough to drive, I bought a set of torches and started customiz-

ing real cars. That's probably where I learned the most about shapes and forms and what tends to be pleasing to the eye. I was eventually hired by General Motors, but my evenings were consumed with an endless variety of projects in my four-car shop. I was always either lowering suspensions, or chopping the tops off pickup trucks, or making fiberglass molds for Camaro and Firebird air dams, whale tails, etc. During that time of my life, I greatly admired the work of Li'l John Buttera, who was probably the most gifted designer and builder of fuel funny cars and street rods of the time.

As for being an artist ... I don't really consider myself much of one. I did win a couple of poster-design contests in grade school before I got caught up in the world of cars, though.

RCRA: How did you become involved in the R/C business, and why did you decide to become a Lexan body maker?

DE: Back in 1989, I was looking to make a career change. I had spent 15 years regretting not pursuing a career in the world of auto racing or automotive design. My interests were actually too diverse for my own good; I was a total gear-head, but simply never got focused on any one career possibility. Living in Canada did not make it any easier to pursue a career in auto racing, either. Opportunities are very limited up here. You might have noticed that Jacques Villeneuve, Paul Tracy, Scott Goodyear and Dale Armstrong no longer live in Canada. Very few Canadians get the



chance to chase their dreams in the world of auto racing, but a few do make it. I think Canada's biggest export is hockey players and comedians ... eh!

So how did I get involved in R/C? It was 1989 when I picked up a copy of *Radio Control Car Action* magazine. Before then, the only R/C cars I had ever seen were those bogus little toys at RadioShack. I was starting to think that the stuff in the magazine was pretty cool, but when I saw a photo of 100 vehicles lined up in a parade of cars around a huge, banked, paved oval, I was pretty freaked out. I started buying every issue of *R/C Car Action* after that and bought my son an RC10. In a later issue, I read the coverage of the R/C Thunderdome and was convinced that I wanted to build R/C stock-car bodies. The bodies in the magazine all looked pretty "generic." I gradually came to realize that the extremely diverse interests I had in auto racing and aerodynamics might actually work in Protoform's favor because there were so many categories in R/C.

It took two years from that time before I found the time to experiment with shaping a racecar pattern from wood and attempting to

Continued from previous page

INNOVATOR AT WORK

make my first mold. I developed a telephone friendship with R/C drag racer Mike Ogle [who now runs the graphic design and advertising departments at Associated Electrics], and he talked me into doing a funny-car mold. Protoform body no. 001 was downright crude, but Mike won a title with it the first time out. It was a very encouraging start.

RCRA: Touring cars have become an important segment of our hobby. Are touring-car bodies becoming a major part of your business, or are off-road, on-road and oval bodies still the bread and butter?

DE: There's no doubt about it: touring cars are a pretty big deal. They're definitely an important part of Protoform's line. In spite of their global popularity, though, we still consider the other types of race bodies to be very important to us. We don't want to forget about the racers and R/C hobbyists who have supported us and helped us get this far.

RCRA: While we're talking about hot sellers, what are some of your most successful Lexan masterpieces?

DE: Masterpieces? Whoa! I'm still trying to get them up to that level. Hot sellers? They're always changing. Stock-car and on-road bodies have always been good, but our latest five touring-car body styles are doing very well.

RCRA: I've heard from other R/C manufacturers that getting products approved by IFMAR can be very difficult. Do you ever run into problems getting Lexan bodies approved for sanctioned racing?

DE: Funny you should mention that. I have been fortunate in the past with regard to IFMAR body approval, although I've been disappointed to see how inconsistent and subjective their rulings can be with regard to bodies. Only moments before



Dale hard at work on another new design. Every R/C body begins as a solid sculpture.

we started our discussion, I received a fax from IFMAR informing me that my latest two touring-car bodies have been rejected and will not be allowed in IFMAR-sanctioned racing. These two bodies have already received ROAR and NORRCA approval and were carefully shaped to fit all of IFMAR's criteria for dimensions, detailing, availability, etc. The reason they were not approved was because they were deemed "too unrealistic in appearance" to be used in competition. Rather perplexing, wouldn't you agree? I guess it answers your question, though.

RCRA: It does sound rather frustrating. Tell me, which criteria do you follow when you start to design a body? Which is more important—scale looks or sheer performance? And along those same lines, does racer input influence your body designs?

DE: Good question, but unfortunately, the answer is complicated. Every mold maker seems to have his own style that reflects his own personal R/C racing philosophy. I'll try to explain how I prioritize between scale accuracy and performance.

We sell bodies to both racers and hobbyists. I will never design bodies that are so functional that scale realism is sacrificed. Racing is important, but scale modelers are important, too.

Continued on page 132

Speed Shop

OFNA's lifetime-guarantee Heavy Duty Hex Wrenches

OFNA Racing* has entered the tool business in a big way with the release of its lifetime-guarantee hex wrenches. That's right; if you ever break a tip, just send it back to OFNA with \$3 to cover postage and handling, and you'll be sent a replacement tip, absolutely free. And yes: the guarantee applies even to those delicate 0.05-inch tips that always seem to break at the most inopportune times. The tips are made of super-grade steel and feature huge, CNC-machined, anodized-aluminum handles (the largest we've ever seen); this gives them plenty of torque for those tough projects. The wrenches are also color-coded for easy identification and are available in all the most popular sizes, both U.S. standard and metric. The wrenches are available separately and in four-piece sets. Part nos. 10813 (four-piece set, metric; includes 1.5-, 2-, 2.5- and 3mm sizes); 10814 (four-piece set, standard; includes 0.05-, 1/16-, 5/64- and 3/32-inch sizes); \$35.95.



Kimbrough lightweight Ultra Mesh carbon-fiber composite pinion gears

Looking for the smoothest, most concentric gear mesh available? Kimbrough* has just what you need to make your car run quieter, smoother, and yes—faster. Kimbrough's new Ultra Mesh gears are precision-molded of a special lightweight, strong, carbon-fiber composite that allows the closest tolerances available. Have you ever set the gear mesh on your vehicle and then found it's too tight or too loose when you rotate the spur gear? Many people mistakenly believe it's the spur gear that isn't perfectly circular (concentric), when it's actually the pinion gear that isn't perfectly round and is causing the gear-mesh problems. Bolt on an Ultra Mesh pinion and banish your gear-mesh problems forever. The pinions feature machined-aluminum sleeves to ensure that the grub screw solidly contacts the flat side of the motor shaft. Offered in both 48- and 64-pitch, the Ultra Mesh pinions cost \$4.50 each and are available in 15- through 30-tooth sizes in 48-pitch and 19- through 38-tooth in 64-pitch.





Team Associated debuts the new RC12L3

Team Associated* has just introduced its new 1/12-scale RC12L3, and to say that this car is loaded with racing features would be a major understatement!

The RC12L3 comes equipped with a new, woven, carbon-fiber chassis that is lighter yet just as strong as its predecessor's. It features six machined battery slots that make the car a terror on 4 or 6 cells. Rear damping is achieved by means of a single VCS (volume-compensating system) Micro Shock for the smoothest, most consistent damping ever. Optional tuned springs are available for precise trackside tuning needs.

Racers will be pleased to know that Associated's race-proven Dynamic Strut Front Suspension remains unchanged and is standard equipment on the new RC12L3. Why mess with success? Perhaps the car's most interesting feature is the new, more secure, three-bolt hub design and included Jaco three-bolt tire and wheel combo. The new three-bolt hubs secure the wheels with just as much security as the standard four-bolt hubs but with one less screw. In addition, every bit of unnecessary material has been machined away from the hubs to reduce weight. To reduce even more rotating mass, the RC12L3 comes equipped with a Factory Team* Graphite-Thru axle.

But wait: there's more. Associated didn't forget the cool factor, either. Factory Team blue aluminum screws, blue ball ends and blue titanium tie rods are included with every kit; wow! No doubt the new RC12L3, with all its cool, blue hardware, will have your competition "blue" in the face with envy. An optional blue shock body, blue hubs and blue motor bulkhead are also available, and that means racers will be able to dress up their cars to their hearts' content. The car is available as a rolling chassis kit and does not include a body, motor, or electronics. Pricing and part numbers were not available at press time; give your hobby dealer or Team Associated a call for more information.



RPM Ride Height Gauge

If you're a serious racer, you probably have one of RPM's* handy camber gauges in your toolbox. Well, the folks at RPM have gone all out to create the most innovative and useful tool to check your vehicle's front and rear ride heights and left to right tweak. The new Ride Height Gauge is just as easy to use as the company's camber gauge and will accurately measure your vehicle's ride height from 0.150 inch to 1.150 inches; this makes it perfect for both on- and off-road applications.

Its ingenious design uses a base and a slide that travel along at a 20-degree angle. It has a graduated scale along the upper edge of the base with easy-to-read lines and numbers. For total accuracy, each gradation represents 0.025 inch. A spring-loaded tensioning knob locks the gauge after you've measured the chassis' ride height, so you can remove the tool and measure the other side. This tool also makes tweak adjustment possible on many cars. Simply measure the chassis' left and right ride heights; the heavier side will always be lower. Team up RPM's new

Ride Height Gauge with your camber gauge, and you'll be able to adjust your car's alignment in the way a professional would. RPM also offers a metric version that measures from 4mm to 29.5mm in 0.5mm increments.

Part nos. 8130 (standard);
8115 (metric);
\$8.95 each.



RACER PROFILE FRANK POLIMEDA



Team Associated driver Frank Polimeda describes himself this way: "six feet tall, with red hair, two arms, two legs and two eyes, dressed in a Jaco T-shirt and driving a fast RC10L3O Team with a heavy trigger finger." Well, this brief description may sum things up, but there's a lot more to this talented oval racer; we invite you to read on and find out the rest.

VITAL SIGNS

Age: 20

Occupation: mechanic

Hometown: Fort Lee, NJ

First R/C car: Tamiya Midnight Pumpkin

Favorite racing class: oval

Sponsors: Associated, Jaco, Protoform, Pro-Line, Novak, Futaba, Mighty Modifieds, Team Orion, Kimbrough, IRS, Lunsford and Shadow Graphics

Hobbies: any form of racing

Major victories: ROAR and NORRCA Nationals, Winterblast and Snowbird

Radio Control Car Action: Oval racing is an important segment of our hobby, and it's one of the fastest racing classes. Meanwhile, NASCAR racing is the most popular spectator sport in the U.S. With the high-speed thrills and the huge following that full-scale oval racing offers, you might expect oval racing to be one of the biggest classes in R/C, but it's actually one of the smallest. Why do you think oval racing is less popular than some of the other racing classes?

Frank Polimeda: It's true that NASCAR is extremely popular; however, the high-speed thrills that fuel NASCAR racing are what hurts R/C oval racing. Technical advancements in R/C cars, motors and batteries have caused speeds and costs to spiral out of control. Stock classes today are faster than modified classes were two short years ago, and this makes it difficult for an entry-level driver to compete—not to mention that excessive speeds abuse bodies, tires, chassis parts and motors, all of which pushes the cost of oval racing beyond the reach of most unsponsored drivers.

RCOA: Interesting. What do you think would make oval racing more popular?

FP: Basically, we need to take the emphasis off lap times and focus on drivability and good competition.

RCOA: Many consider you one of the best oval racers in the world, and I think your resume speaks for itself. What is the secret of your success?

FP: Gee, thanks; how do I pay all those folks off? Anyway, starting at an early age, as I did, individual success was hard to attain. My "secret" is someone who is no secret at

Continued on next page



RACER **n**ews

Continued from page 130

INNOVATOR AT WORK

I feel that scale realism is very important to our industry and sport. That's why Tamiya is a huge success, and touring cars are so popular. Realistic bodies help us to better identify our 1/10-scale racecars with real racecars. For these reasons, I've always tried to keep things as scale as possible. Keep in mind that ROAR, NORRCA and IFMAR all have width and height rules that are nowhere near true to scale. In almost every category of R/C racing, the bodies that are approved for sanctioned racing are too wide and too low. It is in these two areas that I will deviate from true scale to maximize performance.

I always try to find a happy medium, as do most mold makers. When a body manufacturer goes too far in shaping a body for performance only and gets away with it—that is, receives sanctioning approval—the entire sport suffers a little. Then, the sanctioning rules that are provided generally leave so much room for personal interpretation that they almost seem to set us up for controversial rulings.

Finally, I must mention that racer input has a direct influence on Protoform. I want to hear what racers are dealing with, whether good or bad. Racer input provides the information we need to continue to improve our products.

RCCA: So, what are some of your favorite pastimes when you're not working?

DE: Traveling with my wife and three kids is something I love to do. The USA is truly a great country, and I never get tired of visiting new places. I really enjoy landscaping and putting around the yard. I also do a little photography and bike riding, too, but basically I'm a car nut. I'm presently building a pretty trick full-size, 1966 Chevy Malibu SS with a new LT1 engine and a state-of-the-art drive train. It should be done by the year 2000.

RCCA: Sounds like a really cool project. Promise to give me a ride in it when you're done. Dale, what does the future hold for Protoform?

DE: We want to keep on trying to bring racers and enthusiasts the latest, fastest, neatest-looking Lexan bodies that we can. I'm enjoying business as much as ever and really appreciate how well our products have been received over the last seven years. Thanks for making me stop and reflect a bit. I've definitely been blessed!

RCCA: Think nothing of it; thank you for granting us this interview. We wish you the very best in all your endeavors, and keep putting out those cool bodies.

RACER PROFILE

Continued from previous page

the track. My father's support—both financially and morally, not to mention his time—have been factors in my success at the track and in life.

RCCA: Are you involved in full-scale racing in any way?

FP: Currently, I'm driving mini sprint cars here in the Northeast, and I hope to one day move south and get more involved with NASCAR—sort of like when I drove my first R/C car and wanted to become a professional.

RCCA: You used to run for Trinity and had the entire Trinity factory support team on your side. What made you decide to switch teams and go run for Team Associated?

FP: I raced with Team Trinity for seven years. The people there always treated me well and were instrumental in my success over that period. Although I am friendly with the good people at TRC, my strong bond with Jaco Racing tires is no secret. Therefore, when Trinity and TRC merged, it made it difficult to continue. The Associated/Pro-Line powerhouse provided a more comfortable situation for me.

RCCA: How were you involved with the design of the new Team Associated RC10L30?

FP: When I first joined Associated, the new car development was pretty well under way. Team Associated's chief engineer, Cliff Lett, basically used my input and past experience with other cars to fine-tune. I then helped with the extensive prototype testing, which led to the final production version of a winner.

RCCA: What do you consider your most memorable R/C experience?

FP: By far, it was TQ'ing and winning the 1992 ROAR Paved Nationals in the 1/10-scale Stock class. I was 14 years old, unknown, and I had barely won a race at my local track. My dad and I decided to travel to North Carolina to compete at my first national event. There were over 450 entries, and much to everyone's surprise, I set the fast time and won my first national championship. The event was a dream come true.

RCCA: Do you have any words of wisdom to pass along to our readers who may be just getting started in R/C racing?

FP: R/C, like many other forms of racing, has its ups and downs. Just remember to always race hard; the wins will follow. Most important, have fun—and support your local hobby shop.

RCCA: Thanks again for your time, Frank; I look forward to seeing you run at the next big oval race. Good luck.

RACER TIP OF THE MONTH

Joel "Magic Man" Johnson
Team Trinity factory driver

(forward) direction? This means that you'll have to toggle between the two settings every time you run each car.

You can convert your Losi vehicle so the servo runs in the normal direction, thus eliminating the task of toggling back and forth between settings. Just rotate the steering-arm horn on the bellcrank 180 degrees (see photo). Now your Losi vehicle can be set so the servo rotates in the normal direction.

Because of the steering-servo placement on the Team Losi Street Weapon and Double-X4, a transmitter with a reverse SW (servo-reversing) feature is required and must be set so that the steering is in reverse. This is not a problem because most radios (even entry-level types) have this valuable feature. But what if your radio doesn't have multiple model memory and you want to use the same transmitter to control another car, which requires that the servo be run in the normal (for-



6th
ANNUAL

Motor Man Challenge



Goss



Kinwald



Dassonville



Francis

David Goss not only took the TQ, but he also won Stock Truck with ease. I'm sure we'll see a lot more of this guy in the future. Brian Kinwald won both the 2WD and Truck Modified classes but had his fair share of competition. Lloyd Dassonville ended up on top in 2WD Stock. Lloyd must have a very impressive trophy case. Matt Francis was the top contender in 4WD Mod. Hobby Warehouse of Sacramento is Matt's home track.

Every year, Hobby Warehouse* of Sacramento and *R/C Car Action* magazine host the Motor Man Challenge. Now in its sixth year, the Challenge is one of the biggest non-sanctioned R/C racing events and is attended by hundreds of dyed-in-the-wool racers from all over the country. One of the reasons for its popularity is that it caters to grassroots and first-time racers. Big names such as Brian Kinwald, Matt and Mark Francis, Billy Easton, Lloyd Dassonville and Rick Hohwart are also frequently heard on the track's PA system, though, so you know the element of speed is also part of the picture.

SCHEDULE

Five racing classes are offered: for sheer numbers, the 2WD Stock and Stock Truck are the most popular. The 2WD, 4WD and Truck Modified classes are also extremely popular, and the racing action is always head to head. Four qualifiers are run in each of the five classes, and this gives the racers many opportunities to put in a good run. Single Main events determine the winners in the stock classes, while the modified contestants must face a triple A-main format with combined scoring and throw-out rounds. As usual, the racing action was intense, and this gave the many spectators plenty of excitement.

QUALIFYING AND A-MAIN OVERVIEW

• **2WD Stock.** Team Associated/Reedy driver Lloyd Dassonville earned the choice spot on the A-main grid after swiping the TQ from Phillip Atondo in the

fourth and final round of qualifying. Dassonville duplicated his performance in the A-main by winning the event with a big, 8-second lead on second-place finisher Atondo. Brian Strange took third, and David Goss ended up fourth.

• **Stock Truck.** By setting the TQ pace in the second round of qualifying, Bennett Racing Motors/Pro-Match driver David Goss was the man to beat. Brad Nibbelink was the only other driver to break the 14-lap barrier. During the A-main, Goss shot out in front and never looked back, easily winning the event. Nibbelink ended up taking second, while Robert Heacox and Mike Kendall finished in third and fourth, respectively.

• **2WD Mod.** Team Trinity/Team Losi driver Brian Kinwald ended with the TQ honors in this highly competitive class after barely edging out Team

CONCOURS
CHALLENGE

Mike See's first-place-winning Associated* B3. Shawn Dassonville's Associated T3 took second-place honors. Dan Roser won third place with his hot Associated B3.



FIRST



SECOND



THIRD

A special concours event is held every year at the Motor Man Challenge, and the best-looking cars—not the fastest—take home the trophies. For the third year in a row, I was asked to judge the competition; track owner Roger Hubbard was the other judge. As you can imagine, judging this event was a very difficult task, especially when there were so many awesome cars and trucks to consider. After all the scrutinizing was over and the contestants had settled down, we chose the winners.

Mike See of Sacramento, CA, was awarded first place; his tricked-out Associated* B3 had a checkerboard and flame paint job. Shawn Dassonville from Granite Bay, CA, took second-place honors with his purple, gray and white Associated T3, while Dan Roser of Vallejo, CA, rounded out third with his cool-looking "Think Racing" Associated B3. We congratulate all the winners and encourage all racers to think about esthetics whenever they go racing.



Rick Hohwart had the task of distributing the cake provided by Orange Dog racing (a group of diehard racers who travel the country competing at just about every racing event). Each day, member Iris Aromin baked something good for the racers to eat. Thanks, Iris!

Associated/Reedy driver Billy Easton. Team Associated/Reedy driver Lloyd Dassonville was also very much in the running and qualified in third place with a time that was less than 1/2 second behind the leaders. During the triple A-mains, Kinwald made a one-two sweep to take the championship. The win didn't come easy, though, because Easton, Dassonville and Team Trinity/Team Losi driver Matt Francis were on Kinwald's tail the

entire time. After the A-main scores had been tallied, Dassonville ended up in second while Easton finished third.



• **Truck Mod.** Team Associated/Reedy driver Jimmy Jacobson ended up with TQ honors after doing battle with Brian Kinwald, Team Losi/Peak Performance driver Jimmy Babcock and Team Associated/Reedy driver Billy Easton for four grueling rounds of qualifying. Brian Kinwald repeated his 2WD Mod performance by pulling a one-two sweep to take the championship. After the points had been totaled, Jacobson was in second and Easton claimed third.

• **4WD Mod.** Matt Francis was pretty much unstoppable. He easily took the TQ honors by posting a time more than 10 seconds faster than his nearest competitor, Team Trinity/Team Losi driver Chris Bing. During the Mains, Francis was on fire and easily pulled his own one-two sweep to take the championship. Bing ended up in second, while Team Losi driver Jason Moberly finished third.

FINAL THOUGHTS

The Sixth Annual Motor Man Challenge—like the five before it—was a complete success. We congratulate Lloyd Dassonville, David Goss, Matt Francis and Brian Kinwald for their fantastic per-

formances, and we thank them for putting on a great show for the many visitors. See you next time.

**Addresses are listed alphabetically in the Index of Manufacturers on page 209.*

TRACTION TALK

The hard-packed clay-and-dirt track at Hobby Warehouse was challenging and fun at the same time.



Kris Legnitto makes his own slick tires for his stock-class truck. Using a hobby knife, Kris grinds the spikes off a Team Losi Silver-compound tire. As you can see, it's a messy task.

Traction was the biggest obstacle the racers had to face, however, because the track quickly developed a narrow blue groove that circled its entire perimeter. This narrow "zone" provided an enormous amount of traction, but if the vehicles strayed even an inch outside it, it was loop-out city.

Slick tires became the hot ticket, so the racers broke out their Dremel tools and started to grind away their tires until only a slick surface remained. Team Losi's Silver and Pro-Line's M3 were the most popular compounds, and racers made sure that they doused them with Trinity* Buggy Grip or Reedy* Traction Action before every run. The homemade slick tires provided the traction the racers demanded, but they had to drive conservatively to prevent traction-rolling in the corners, while a spinout was a sure thing if they fell out of the zone.

6TH ANNUAL MOTORMAN CHALLENGE

FIN.	QUAL.	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	BODY	TIRES (F/R)	TRACTION ADDITIVE	PINION/SPUR
2WD Mod Buggy											
1	1	Brian Kinwald	Losi XX-'CR'	Trinity 12x2	Trinity VIS 2000	Novak Atom	Airtronics 3PS	Losi	Pro-Line M2/Pro-Line M3	Trinity Buggy Grip	22/81
2	3	Lloyd Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	NA
3	2	Billy Easton	RC10B3	Reedy 10x4	Reedy Zappers	LRP V6	Futaba	Associated	Pro-Line 8175 M2		
									Pro-Line 8184 M2 Holeshot	Assoc. Traction Action	18/81
2WD Stock Buggy											
1	1	Lloyd Dassonville	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	Associated	25/83
2	2	Phillip Atondo	Losi XX-'CR'	Peak Performance	Peak Performance	Novak Cyclone	Airtronics	Losi	Losi	Zip Grip	22/84
3	3	Brian Strange	Losi	Bennett	Maxtec	Novak Cyclone	Airtronics 3PS	Losi Xcelerator	Pro-Line	Buggy Grip	20/84
Truck Mod											
1	2	Brian Kinwald	Losi XX-T 'CR'	Trinity 12x2	Trinity VIS 2000	Novak Cyclone	Airtronics 3PS	Losi	Pro-Line M2	Buggy Grip	18/87
2	1	Jimmy Jacobson	Associated T3	Reedy 10x2	Reedy Zappers	LRP IPC V6	KO Propo Mars	Associated	Pro-Line Holeshot M2	Assoc. Traction Action	18/87
3	4	Billy Easton	RC10T3	Reedy	Reedy Zappers	LRP-V6	Futaba	Associated	Pro-Line Edge M2		
									Pro-Line Holeshot M2	Associated	18/87
4WD Mod											
1	1	Matt Francis	Losi XX-4	Trinity D3 12x2	Trinity VIS 2000	LRP IPC V6	Airtronics M8	Losi	Pro-Line M3	Trinity Buggy Grip II	18/86
2	2	Chris Bing	Losi XX-4	Trinity D3 11x2	Trinity VIS	Novak Cyclone	Airtronics 3PS	Losi	Pro-Line M3	Trinity Buggy Grip II	18/84
3	3	Jason Moberly	Losi XX-4	Racetech 10x3	Racetech 2000	Novak Cyclone	Airtronics M8	Losi	Losi Blockhead Smoothies		
									Losi Spiral Smoothies	Trinity Zip Grip	16/84
Stock Truck											
1	1	David Goss	Losi XX-T 'CR'	Bennett Racing Motors	Pro-Match	Novak Cyclone	Airtronics 3PS	Losi	Pro-Line M2	Zip Grip Free	21/88
2	2	Brad Nibbelink	Losi	Insanity Motor Works	NA	LRP	NA	Losi	Losi	Trinity	22/87
3	4	Robert Heacox	Losi XX-T 'CR'	Bennett Racing Motors	Trinity	Novak Cyclone	Airtronics M8	Losi	Pro-Line	Assoc. Traction Action	21/88

HOME BUILT PROJECT

Although nitro-powered cars always seem more scale because of their authentic sound and smoke, the 2-stroke powerplants they employ hardly reflect current automotive technology; I doubt that a single premix-burning car has rolled across an American highway since the Saabs of the early '60s. Yep, it's a 4-stroke world—maybe even in the R/C world, if Doug Huse of New Milford, CT, has anything to say about it.

"Wouldn't it be cool," Doug thought, "to build a 4-stroke monster truck?" You're probably already nodding your head "Yes!" Let's see how Doug went about building his 4-stroke four-wheeler.

by GREG VOGEL

Kyosho USA-1 4-

GETTING STARTED

Doug is one of those guys who can't leave his vehicles stock. So, after purchasing the Kyosho* Nitro USA-1, the chosen platform for the project, he went directly to the last page of the instruction manual where the optional parts are listed—and got 'em all! And he didn't stop there. To increase the





truck's durability and glamour factor, Doug ordered shiny MIP* CVDs to link the USA-1's front, rear and center diffs; Lunsford* titanium turnbuckles and hinge pins to replace the stock steel pieces; and a selection of the kit's aluminum parts was sent to the Aluminum Finishing Co.* in Bridgeport, CT, for a shot of red anodizing.

Most of the truck's assembly was by the book until it was time to install the engine. The powerplant of choice was an O.S. Engines* 40-size Surpass 4-stroker designed for R/C airplane use. Although the engine fit between the engine-mount rails, the mounting holes were off. To attach the engine, Doug carefully drilled two new holes in the crankcase to line up with existing holes in the mount and removed some material to allow the center CVD to clear the engine. The next hurdle was the flywheel; R/C airplane engines don't use one, so a custom piece was machined from solid steel. Doug wasn't able to knurl his flywheel, so he grooved it with a rotary tool to give his starter box some grip. Following this step, he drilled small holes in the "heavy" side of the flywheel to balance it. Doug added Kyosho's heavy-duty clutch shoes and a Megatech* clutch bell to complete the power package and mate the engine with the truck's stock gears.

PHOTOS BY WALTER SIDAIS

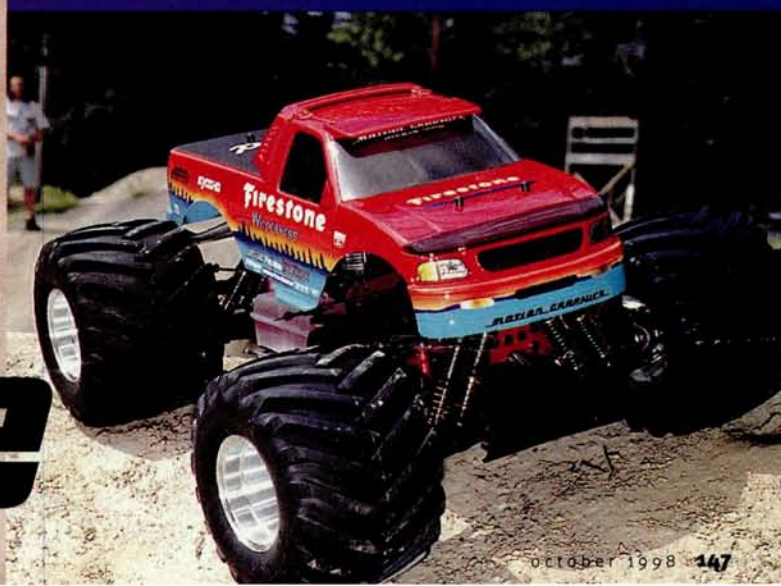
Stroke



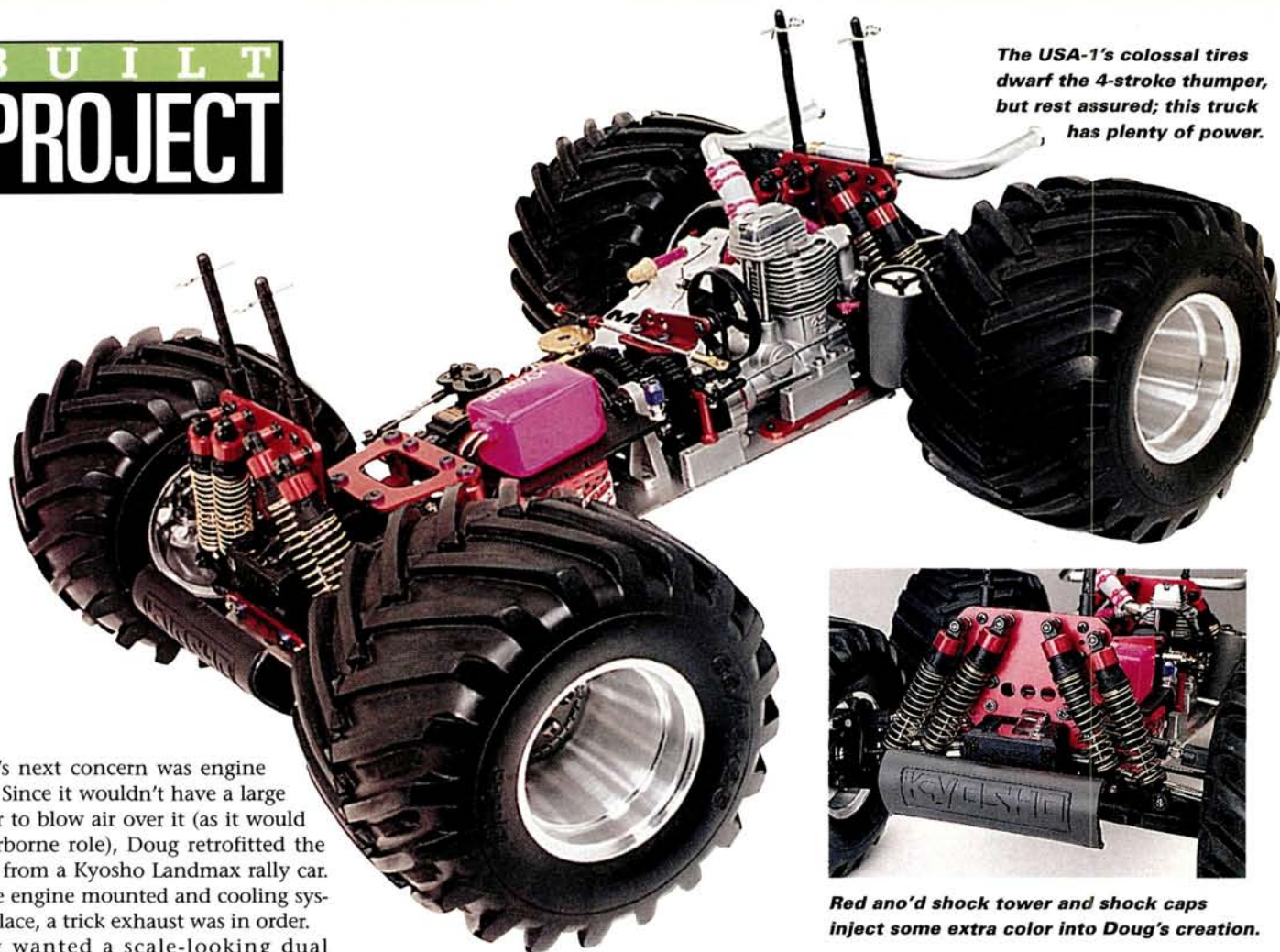
A MONSTER



WITH MUSCLE

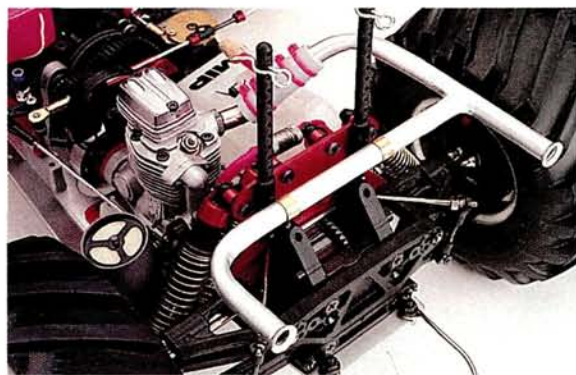


The USA-1's colossal tires dwarf the 4-stroke thumper, but rest assured; this truck has plenty of power.



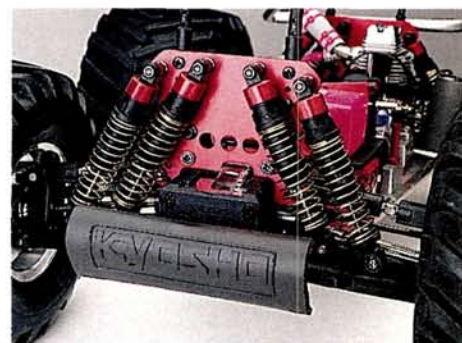
Doug's next concern was engine cooling. Since it wouldn't have a large propeller to blow air over it (as it would in its airborne role), Doug retrofitted the fan unit from a Kyosho Landmax rally car. With the engine mounted and cooling system in place, a trick exhaust was in order.

Doug wanted a scale-looking dual exhaust—hardly an off-the-shelf item. He used $\frac{3}{8}$ -inch brake-line tubing (for full-scale cars) and bent it to exit under the



right rear corner of the body. Then he carefully drilled a hole in the side of the pipe and attached another piece of tubing to run to the other side of the body. Although this provided two exhaust tips, little exhaust would have traveled "the hard way" out through the left pipe. With a great deal of foresight, Doug built a deflector into the primary (right) pipe to direct

The custom exhaust has some unique internal features to ensure that equal amounts of smoke pour from each tip (see text).



Red anod shock tower and shock caps inject some extra color into Doug's creation.

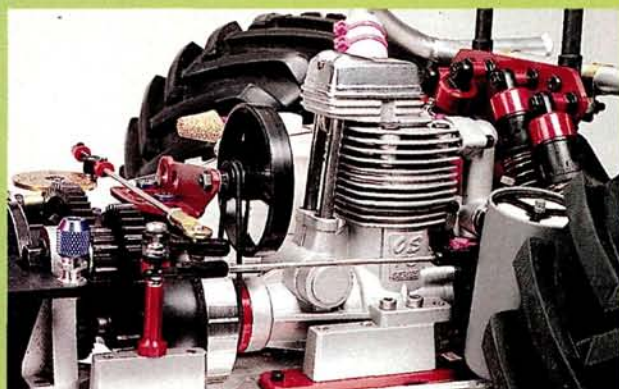
half the exhaust to the left pipe. It worked! To complete the system, Doug baked on a coat of high-temperature exhaust-system paint to give the pipes a seamless factory look, and custom brass straps were added to secure the pipes to the rear shock tower.

With the engine and exhaust installation licked, Doug faced the challenge of setting up the throttle linkage. After sifting through some old spare parts, he decided on a Kyosho engine mount and a post from an old urethane bumper to support a GP-10 throttle bellcrank. Some 2-56 threaded music wire made up the rest of the linkages.

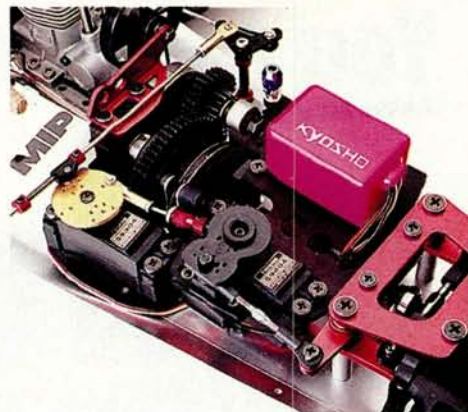
Why a 4-stroke?

In addition to the pure cool of a rumbling bass note, Harley-esque valve covers and external pushrods, there are viable performance reasons for going to a 4-stroke engine. First and foremost, a 4-stroke has a broader "power band"; in other words, the engine makes usable power through a wider rpm range. Also, there is much more power at low rpm than there is with 2-stroke power. Monster trucks need all the torque they can get, so Doug's choice of an O.S. Surpass .40 was a wise one. Last, 4-strokes don't need the benefits of a tuned pipe, and this allowed Doug to create a scale-looking, narrow-gauge exhaust system for his truck.

Apparently, the 4-strokes for cars idea has caught on with O.S. in a big way, as it will soon release a car-specific 4-stroke powerplant. Expect some interesting projects (and production cars) to be based around the new thumper.



A pair of Futaba servos keeps the truck under control, and a custom linkage operates the throttle. Note the gear reduction required to accommodate the monster-size tires.



PARTS USED

When custom-building a project vehicle, it's often difficult to know which parts will fit it and what you will need to make your creation work. Luckily, Doug kept a detailed list of the parts he used (after ordering and returning dozens of parts). If you want to create your own 4-stroke monster, here's the list:

- **Kyosho**
 - Nitro USA-1 kit
 - KC-45 heavy-duty clutch shoes
 - BSW-70 stabilizer set
 - 1710 antenna holder
 - 39308 fuel filter
 - GT-3 cooling fan
 - GT-4 fan belt
 - 92302 receiver protector
 - BS-65 fuel tank
 - W0137 6.8 hard pivot balls
 - Air filter
 - Heavy-duty aluminum bellcranks
 - Inferno bearing set
 - 3mm and 4mm flat-head screws and anodized washers
 - GP10 bellcrank and engine mount
 - Aluminum standoff urethane bumper set
- **O.S. FS 40 Surpass 4-stroke engine**
- **Parma Bigfoot body**
- **MIP CVDs**
- **Lunsford titanium tie rods and turnbuckles**
- **Megatech 13-tooth clutch bell**
- **ESP shock bushings**
- **Hobbico exhaust deflector**
- **Hangar 9 servo wheel and ball-bearing links**
- **Custom-made**
 - machined-steel flywheel
 - 3/8-inch brake-line tubing for exhaust
- **Anodizing by Aluminum Finishing Co., Bridgeport, CT**
- **Radio equipment**
 - Futaba 3PDF
 - Futaba servos 9304 and 9404
 - Dynamite 6V receiver pack

To finish up his project truck, Doug picked up a Parma* Bigfoot body and sent it off to be custom painted by Richard Muise of Motion Graphics*.

RUNS WELL AND LOOKS GOOD

The most exciting element of a 4-stroke engine is its sound. This truck has that awesome, galloping low rumble, and it's loud. Four-strokes are also known for their torque, and this is an ideal trait for a heavy truck. When Doug hits the throttle, the low-end grunt gets the USA-1 moving in a hurry with smoke billowing from both pipes. Geared low, the USA-1 with a 4-stroke can make mincemeat of just about anything. It's impressive!

*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

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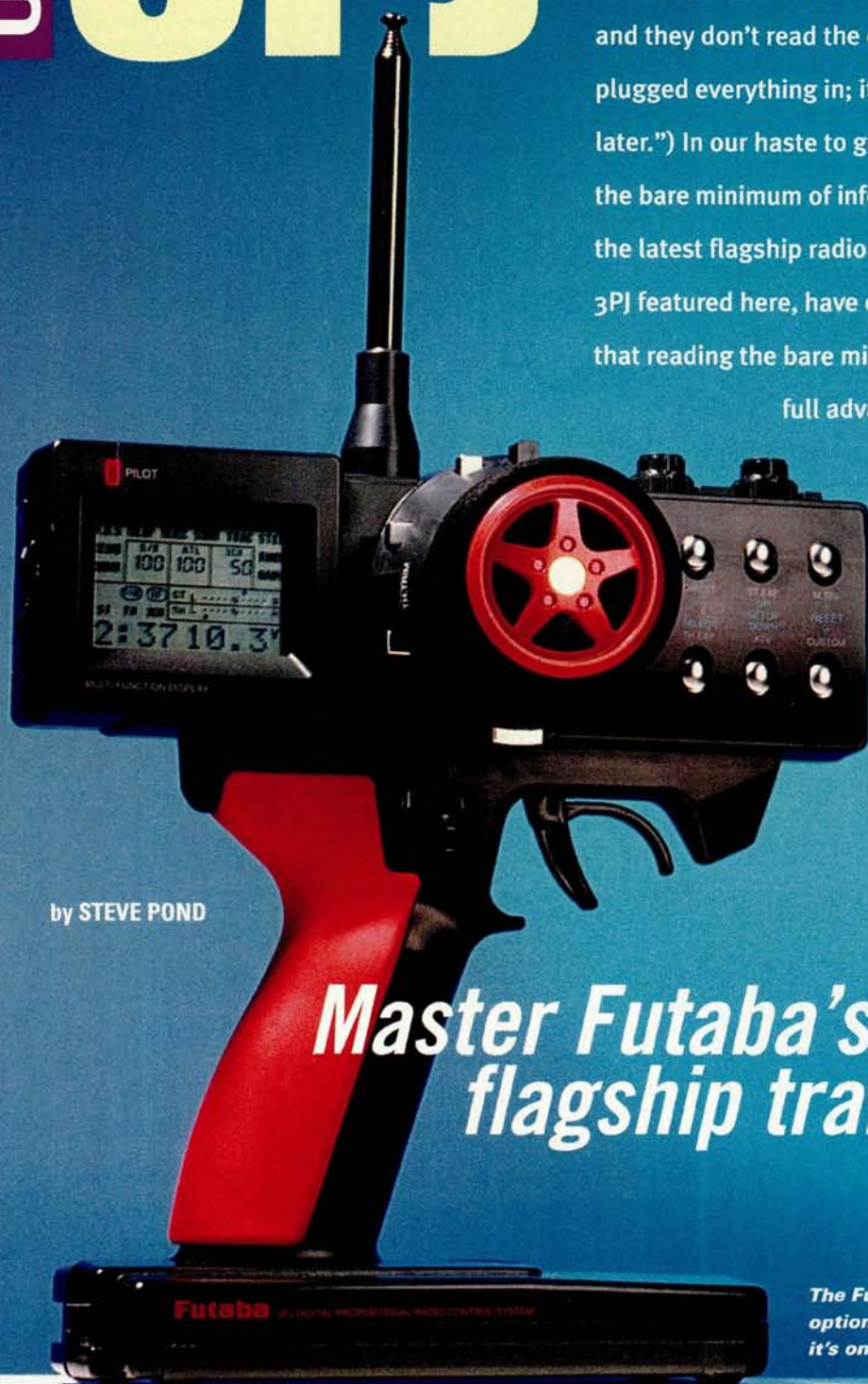
FUTABA MAGNUM 3PJ

TRANSMITTERS FOR R/C cars are treated much like home VCRs. I bet many of you have VCRs whose clocks are still flashing "12:00." I'm even willing to bet that the most popular VCR accessory is black electrical tape to cover that clock (for the record, my VCR clock is properly set).

Most people never read the instructions that come with VCRs, and they don't read the ones that accompany R/C systems. ("I plugged everything in; it worked; I'll worry about the details later.") In our haste to get those wheels rolling, we often settle for the bare minimum of information—just enough to get going. But the latest flagship radio systems, including the Futaba* Magnum 3PJ featured here, have elevated radio technology to such heights that reading the bare minimum just won't cut it anymore. To take

full advantage of a transmitter like the 3PJ, you

must make an effort to understand its many features. When you've done that, you'll go faster—easier. This "User Guide" will help; the information provided is specific to the 3PJ, but you'll also find it relevant to other top-of-the-line systems with similar features.



by STEVE POND

Master Futaba's flagship transmitter

The Futaba Magnum 3PJ (shown here with the optional red grips and wheel) may look simple, but it's one of the most sophisticated systems available.

FM or PCM

The 3PJ is a dual-mode transmitter: it transmits FM and PCM signals. Available with either an FM or a PCM receiver, the 3PJ can be switched between these modes with a few simple button pushes.

DIRECT MODE

The 3PJ's functions are grouped logically so that the most used are also the most accessible.

Pushing the "Direct" button on the transmitter gives instant access to the features most commonly used trackside:

- **ATV (adjustable travel volume)**—designed to independently adjust left and right servo travel, or forward and brake/reverse. For example, in a nitro-powered car, the throttle servo usually requires more servo travel on the throttle side than on the brake side. Using the ATV function, the brake side of the servo travel can be adjusted without affecting the neutral point or the limit on the throttle side of the servo. I do not recommend that you use this feature for the throttle when you're using an ESC. Most modern ESCs have their own electronic setup features, and using ATV may adversely affect their operation. ATV is available for all three channels of the 3PJ and should be used whenever independent adjustment is desired.

- **EXP (exponential)**—one of my favorite features. It modifies how your car will respond to steering or throttle/brake input. It can be used to make the controls more or less sensitive (depending on the desired result). I've found this feature extremely useful; negative values make the steering less sensitive around neutral, and that makes it much easier to make minor steering corrections on straightaways. You may also make the steering more sensitive by setting the EXP to a positive value, but this is not recommended unless it's a quick fix to a drastic understeering problem.

EXP is also available for the throttle while in direct mode, but I prefer a linear response, unless I'm drag racing. For the best drag-racing performance, you need immediate and full throttle response; setting the throttle EXP to the highest positive value will accomplish this.

- **Model select**—one of the great strengths of the Futaba 3PJ and of other similar systems. The 3PJ can store all of the intricate settings that are unique to your car—up to as many as eight cars! Buy another receiver or move the receiver from one car to another, and the 3PJ is instantly ready to go (as long as initial settings have been made for each car). This function is also valuable if you race on a variety of tracks and in a variety of conditions. Even with the same car, your transmitter settings may have to be changed from track to track. Use model select to memorize these settings and reduce setup time. Car and track names with up to six characters help you

identify settings and eliminate confusion about which group is for what.

- **Custom**—allows you to move one of the select mode functions to the direct menu for easier access. The select mode functions listed in the following section are where you'll find most of the really interesting stuff.

SELECT MODE

Once you're through initial setup, select mode functions rarely require much attention. To access them, simply toggle through the menu that appears on the 3PJ's LCD. These are the functions that can make seasoned drivers' racing experience a little more fun—and fast.

- **Subtrim**—can be used to adjust the neutral point of any of the three channels; works in very much the same way as the regular trim buttons around the steering wheel. The advantage of having subtrim is that initial adjustments can be made without affecting the amount of trim adjustment that is available when using the normal trim adjustment buttons.

- **Steering speed**—as the name implies, this function allows you to adjust steering-servo speed. Note: it won't make a servo faster; it can only slow it down—by as much as 0.15 second. A servo's turn and return actions may also be independently adjusted; for example, to take a turn, you can slow the servo's reaction for increased stability, while the return action can be set to work at full speed—or vice versa. All who have paid over \$100 for a high-speed, high-torque steering servo (that includes me) will probably wonder why they would ever want to slow their mega servo. If you have a very twitchy steering hand, slowing the servo may be useful to smooth out the turns.

- **ABS (anti-lock braking system)**—technology borrowed from the world of full-scale cars. By preventing the wheels from locking, it allows more control of the car under hard braking. When any car, R/C or otherwise, has its wheels locked up under braking, there's always a loss of stability. This is most obvious in a 4WD R/C car, as the front wheels and the rear wheels lock (assuming no one-way bearing in the front end). With all the wheels locked in a turn, steering is virtually lost, and you'll likely end up on the boards, or at least way too deep into the turn.

In a 2WD car, ABS can also help tame an oversteer problem. When applying the brakes in a 2WD car, all the stopping



Left: every one of the 3PJ's programmable features is accessible through the buttons on the control panel. Below: the multi-function display contains the most critical information at a glance. Other settings are displayed when the corresponding function is accessed.



power comes from the rear wheels. If they lock, especially in a turn, the rear end will tend to slide out. By allowing a subtle rear-wheel rotation while braking, ABS will help to keep the rear wheels planted. ABS essentially pumps the brakes for you, and this allows the wheels to keep rolling even under hard braking.

Conventional wisdom says that, all the braking should be done before entering a turn, but even the best drivers don't manage to get it right every time.

The 3PJ's ABS is adjustable in four ways:

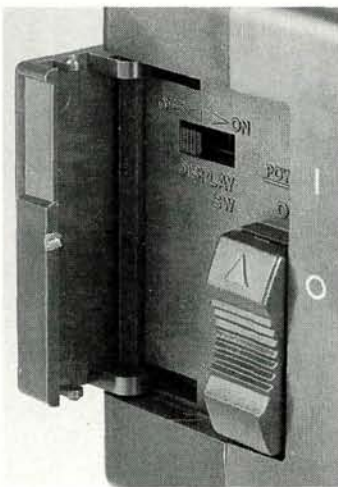
AB.P. (anti-lock brake pulse)—from the initial "off" position, this function is used to determine how much the brakes let off when ABS is activated. For example, when a value of 50 percent is selected, each pulse of the ABS will toggle the brakes between full and half. A value of 100 percent results in brake pulses between the full and the off positions.

CYCL.—this adjusts how quickly the brakes will "cycle," or pulse. Typically, the quicker pulses are better; but this setting requires a little experimentation and will depend on the equipment used. The pulse rate is adjustable from 1 to 100, 1 being the fastest setting and 100 being the slowest. Faster pulse rates require faster servos (for gas-powered cars that use a servo for throttle/brake). Slower servos can't keep up with the pulse rate and end up fluttering somewhere in the mid-range of the settings. For standard servos, I've found it's best to stay above a 6 or 7 setting on the cycle rate. High-speed servos can take advantage of faster cycle rates, but even they have trouble keeping up at the fastest setting. Settings as low as 2 or 3 can be used with very fast servos. On the

other hand, electronic speed controls in electric-powered cars are lightning quick and can use even the fastest pulse rate. (Note: when doing a push-button setup on your ESC, make sure ABS is off.)

DUTY.—up to this point in our experiments with ABS, the “on” and “off” brake pulses have been of equal length, or “even.” This is the default setting for the DUTY function—“EVEN.” “LOW” and “HIGH” settings are also available and will bias the ABS toward providing more or less braking. For example, set LOW, the ABS function’s “off” pulses are longer than the “on” pulses and vice versa. I prefer the HIGH setting because it gives stronger braking while maintaining the stability ABS provides.

ST.M.—steering mixing (my favorite). It allows ABS to be mixed with the steering channel. As I said, it’s always best to do all of the braking before you enter a turn, but when we don’t get it right, ST.M can help out. With steering added to the “mix,” braking isn’t affected by ABS until the steering wheel is turned. Then, depending on how ST.M has been set up, ABS can be progressively activated to keep the car on track. The default setting is “OFF,” and it will not affect ABS operation. From the default, you can select positive or negative settings from 1 to 100.



Left: a display switch allows adjustments of the transmitter without transmitting a signal. **Above:** an optional direct servo connect (DSC) cord connects the transmitter and receiver, permitting full use of the radio gear without transmitting a signal.

Negative mixing-function settings are not recommended. Any number in the negative range provides normal and full ABS operation in a straight line. As soon as you begin to turn the steering wheel, however, the mixing will reduce the depth of the brake’s “off” pulses and effectively shut off the ABS while increasing the chance that you’ll lock up the wheels in a turn.

Numbers in the positive range, on the other hand, are highly recommended. With a positive ST.M setting, ABS isn’t active when your vehicle is traveling in a straight line. As soon as you start to turn, however, ST.M progressively increases the depth of the brake’s “off” pulses to provide increas-

ing directional stability as you turn; the harder the turn, the more ABS you’ll have. I recommend a setting of +100, as this will fully activate ABS at full steering lock.

• **Idle-up**—this is exclusively for gas-powered cars. When you start a cold engine, it’s sometimes difficult to keep it running. Once it’s running well, it’s very handy to have another pair of “hands” on the transmitter to keep the engine’s speed up and prevent it from flaming out. Idle-up can be set to hold the throttle slightly open, and that makes a one-person starting operation much easier. One caveat: be careful not to set the



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idle-up too high, or you may have to chase your car through the pits (not that it's happened to me or anything; I've just heard that it *can* happen ...).

Idle-up may also be used to experiment with drag brakes (slight brake applied when the throttle is returned to neutral).

- **Throttle acceleration**—primarily for gas-powered cars. It increases the sensitivity of the throttle from the idle position. When testing this feature with already snappy nitro-powered engines, I noted little, if any, improvement in throttle response. In some applications— $\frac{1}{4}$ -scale cars, perhaps—the engines might not respond to throttle as quickly, and that's where this feature may be more useful.

- **Start**—a tricky function that's designed to limit initial throttle response in slippery conditions. Here's the concept: for only the first application of throttle, this function will limit maximum acceleration until the trigger is released and will revert to normal operation thereafter. Two functions must be input for the function to operate:

Trigger position—tells the radio at which point in the throttle travel this feature is supposed to self-activate.

Preset position—tells the radio the throttle percentage needed.

You might assume that if you set the

trigger to 30 percent and the preset to 30 percent, you'll get 30-percent throttle until the trigger is released. But testing revealed that a setting of approximately double the preset position is required for smooth operation, i.e., to avoid a "pulse" of throttle. A 30-percent preset position requires that the trigger position be set at around 60 percent; don't ask me why.

Another glitch: on reaching full throttle, the radio is supposed to revert to normal operation. It does switch back to normal operation as advertised, but it doesn't wait until the trigger is returned to the preset point; it switches the moment you begin to release the throttle. This means that you get a quick blast of full throttle! This comes at the worst possible time, as most of us only let off the throttle to slow for a turn.

Given my experience, I don't recommend that you use this feature. You're better off accelerating more smoothly with your trigger finger to avoid tire slippage.

- **Traction control**—can adjust the throttle curve to lessen throttle response, and that helps eliminate wheelspin. Without getting into the details, I'll simply say that I prefer the current limiters commonly found in ESCs. It isn't that the traction-control function isn't effective; it's just that current limiters can more closely monitor power output and, hence, control wheelspin more effectively. The

advantage of traction control over current limiters is that it can be turned on and off as needed from the transmitter, and it also works with gas-powered cars.

- **Step**—allows you to determine the incremental rate of adjustment made with each "click" of the input buttons for many of the radio's functions. Some of the features default to 5 percent increments; others, to 1 percent. I used this feature to change all of the adjustments to 1 percent increments. In my opinion, you can never have too fine an adjustment.

- **Timer**—a handy little feature that allows the drivers to time their own laps. One of the 3PJ's many programmable buttons can be assigned to the lap timer, which can store up to 99 lap times. It's activated when the throttle is pegged for the first time. A timer beeps at 1-minute intervals all through the race, and a programmable alarm lets you know when you're close to the end of it (30 seconds or less).

- **Lap navigation**—a great practice tool that lets you program a competitive lap time to see how close your own times are. For example, if a fast lap time at your track is 20 seconds, you'll hear a beep every 20 seconds to let you know your target time has expired. If, for some reason, you need to stop, or you end up



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USER GUIDE: FUTABA MAGNUM 3PJ

on your lid, one of the buttons can be assigned to reset the lap timer.

• **Model name**—the 3PJ can store settings for up to eight cars and assign each car a name.

• **Setup mode**—relates to basic parameters that are least likely to be revisited once they've been initially set. Access setup mode by pressing the "up" and "down" buttons at the same time.

• **Dual rate**—simultaneously adjusts the left and right steering-servo travel. Whenever the steering servo travels beyond the mechanical limits of the steering linkage, there is binding, and that causes a heavy load on the servo and can damage gears.

• **Second dual rate**—with the reduced steering travel of some dual-rate settings, it's more difficult to get out of a tight situation, such as when your car is stuck against the boards. At times, such as when you're high-speed oval racing, dual rate is used to reduce steering and enhance control. The second dual rate can restore full steering travel. When you're out of trouble, the original dual-rate setting is easily activated.

• **ATL**—mostly useful for gas cars that have a throttle/brake servo instead of a speed control. ATL limits the servo's brake travel for precise brake adjustment, but it doesn't affect throttle settings.

• **Throttle neutral**—this function allows the user to toggle between two throttle ratio settings. The default setting is 50 percent throttle/50 percent brake, which provides equal response for both forward and reverse. This setting is preferred for applications that use reverse because it provides more proportional control in both directions. The alternative choice is 70 percent throttle/30 percent brake; this setting should be used in racing applications to provide more proportional throttle response, and it should *always* be used with an electronic speed control.

• **Programmable mixing**—any application that requires dual steering servos or dual speed controls would use this feature. One of the radio's channels is set up as the master channel, and then a "slave" channel is selected (this will be given the same input as the master channel). The list of mixing possibilities includes servo-reversing, individual trim settings and variable mixing rates. If you ever wished to have special functions such as active wings or operational scale accessories operate in conjunction with the throttle or steering operations, well, now you can.

• **Tilt mixing**—appears to have been designed (or at least named for) tilt mixing in boat applications. Boaters with

on-the-fly tilt capability prefer to tilt the boat's bow downward in turns and bring it back up on the straights. Tilt mixing makes it very easy to mix a tilt servo with the steering channel to accomplish this.

• **Servo-reversing**—allows the servos to operate in reverse of their normal operation.

• **Function-select dial**—the 3PJ's dials can all be assigned (and reassigned). The two dials on the grip, the third-channel knob on top and both trim adjusters can be assigned any one of these functions: dual-rate, ATL, steering trim, throttle trim, traction control, ABS return rate, ABS cycle rate and channel 3; or each can be individually disabled. Likewise, all the switches can be programmed. The switches include the push-button under the steering wheel, the idle-up switch on top of the radio and the custom button on the front face. These switches can be programmed to accommodate these functions: lap timer, throttle preset, traction control on/off, idle-up on/off, dual rate (both), channel 3, subtrim, steering speed, ABS on/off, throttle acceleration, throttle preset, step, timer and model name, or each can be disabled. The possibilities are mind-boggling. Avoid getting bogged down in trying to craft the ultimate radio setup. Use the buttons and switches as you need them, and don't worry about them otherwise.

• **Fail-safe**—reserved for those who opt for the PCM receiver. It's invaluable, especially for R/C vehicles that would pose a risk if they were to go out of control when traveling at high speeds. Two fail-safe modes protect against the conditions that can cause loss of control, i.e., loss of signal and loss of receiver power (note: the battery fail-safe is effective only against low battery voltage; it will not protect your car if the battery is disconnected). The throttle and steering can be set to move to a certain point if the fail-safe is activated. For example, if an 1/8 nitro-powered car loses its radio signal, the fail-safe could apply full brakes and return to neutral steering. The alternative is much less desirable—trust me!

The rest of the radio's features have to do with "housekeeping"—screen-contrast adjustment, alarm tone, copying or clearing model settings and mode adjustments.

The bottom line is that the 3PJ is one of the most—if not *the* most—sophisticated radio systems in the world. It comes at a hefty price, but that's the cost of having the best. Its only downside is that owners aren't able to use the old "My radio ..." excuse for a poor performance. This system can do so much to improve your driving—short of actually driving the car itself—that it's time to start looking elsewhere for a scapegoat!

**The address of the company featured here is listed alphabetically in the Index of Manufacturers on page 209.*

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Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.



196
OFNA
Car Stand



199
DuraTrax
Universal
Starter Box



199
Trinity
Tire Warmers

OFNA Car Stand Take a Stand!

For a long time, I thought I really didn't need a high-quality set of hex wrenches. Then I got a set, and I couldn't believe I had ever wrenched without 'em. For a long time, I thought a \$12 soldering iron was fine, then I bought an Ungar Race Station—and I couldn't believe how much easier my bench life became. Most recently, I was made aware of how inadequate a hunk of 2x4 is as a car stand, thanks to OFNA's new car-maintenance station.

It's a simple thing; the car stand comprises a plastic base and a rotating platform joined by a heavy-duty aluminum standoff. The foam-padded platform provides a non-slip grip, and its pressed-in aluminum bushing allows it to swivel. Likewise, the base includes its own aluminum bushing. There's also a large parts bin, and a storage space for the aluminum standoff and shock holder.

Shock holder? Oh, yeah, this is the really cool part. The platform has a slot that accepts a plastic, slide-in jig that holds the shocks; up to four shocks simply snap into the jig and are held by their shafts. This is handy while building, as you can fill the shocks, tap out the big air bubbles, then let the shocks sit open-topped until all the super-tiny bubbles have escaped—without any fear of knocking the full shock bodies over.

When not in use, the shock holder and standoff are stored in the base, and the platform is then flipped over to serve as a lid. It doesn't snap shut, however, and that's my

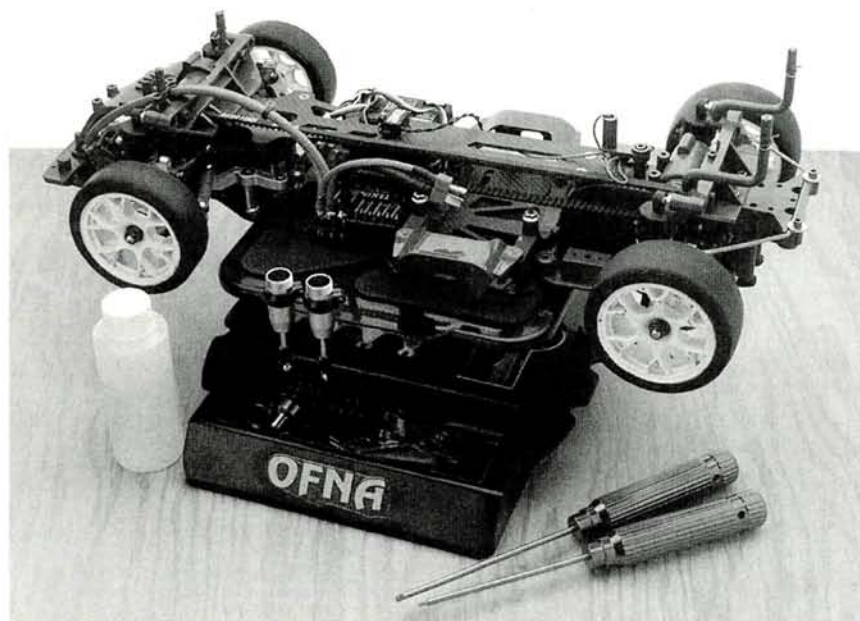
only complaint (I use a rubber band to keep mine closed); otherwise, it's great. I can turn the car easily for tire replacement and blip the throttle without having to hold the car in the air, and my car is held high enough to clear the tops of my charger, batteries and most of the other stuff I keep on the ridiculously small folding table I bring to races. The parts bin prevents my body clips, pinions, gear-cover screws and any other pit detritus from getting lost, and the whole magilla stores easily in one small package. I like it!

—Peter Vieira

The OFNA car stand comes in colors, to boot: neon orange (10900), neon yellow (10901) and basic black (10902).

List price: \$19.95

When it's time to pack up, all the stand's components are stored in the base and capped by the foam-padded platform. Note the large-diameter bushing and the heavy gussets; this is a sturdy stand.



LIKES

- Self-storing.
- No more shock spills.
- Sturdy, with smooth swivel action.

DISLIKES

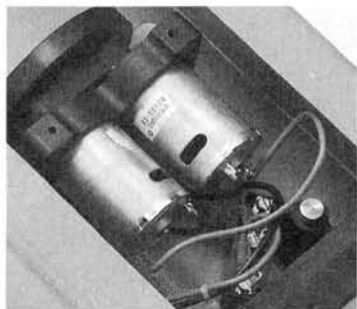
- Doesn't "snap" shut.

A place for everything, and everything in its place. The shock holders are a big help.

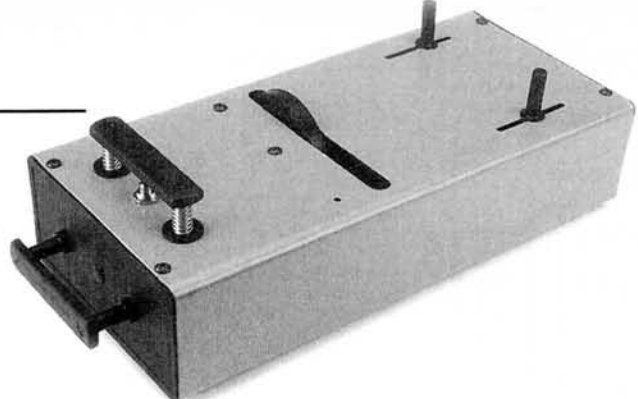
DURATRAX

Universal Starter Box Juice Box

Although pull-start nitro engines are undeniably convenient, racers often remove the pull-starter in an effort to get quicker acceleration and more top speed from their engines. Of course, it's still necessary to get the engine fired up to realize those gains, and that can be when the frustration begins; how many of you nitro guys have rubber smears across the bottom of your chassis from clumsy bump-start mishaps? A starter box, which houses a fixed rubber flywheel to engage the engine's flywheel for a quick start, is the answer. DuraTrax* has a nice one in its Universal Starter Box.



DuraTrax sells the kit unassembled. It features a heavy-duty, bright orange metal case with molded plastic ends. A carrying handle is attached to one end, and input jacks are installed in the other. The instructions are vague, but with only a little reading between the lines, you shouldn't have any problems assembling the unit. The instructions



show two wiring schemes to be used with a dual Ni-Cd setup or an external 12V power source. I found that either setup provides enough cranking power to turn even the most stubborn engines. Power comes from twin 550-size motors coupled to a belt-drive system with ball-bearing-supported gears and pulleys to ensure long life and efficient operation. The starter assembly can be bolted into the left or right side of the case, as required by your application.

Included in the kit are two extra-long adjustable alignment pegs that, when set properly, eliminate any need to guess where to place the car on the box for starting. A heavy-duty on/off switch is actuated when the car is pressed down on the starter box.

As with most starter boxes, you'll need additional equipment. Some steps require soldering, and you will also need a 12V power supply or two 7.2 Ni-Cd packs and a charger to keep the juice up.

By ensuring reliable starting, this rugged, relatively inexpensive (about \$60) accessory should keep your race day hassle free and make fast fun-runs more convenient.

—Derek Buono

LIKES

- Powerful starting unit.
- Carrying handle.
- External charging/power jacks.

DISLIKES

- Instructions need improvement; often difficult to determine which hardware goes where.
- Vague instructions.

PHOTOS BY WALTER SIDAS

TRINITY

Tire Warmers Heating Up Performance

We've all seen it countless times in full-scale races: as the pace car holds the reins on the field, the drivers saw their steering wheels back and forth, zigzagging their machines across the track. This seemingly erratic driving is an effort to scrub some heat into the tires to obtain optimum traction when the green flag drops.

In R/C competition, electric cars cannot waste precious run time on tire-warming laps, and gas vehicles are generally not on the track long enough to generate much heat in the tires during the prerace, engine-warm-up laps. At the start tone, most of us drive a little more cautiously until the tires become warm and deliver maximum grip—then we cut loose. Wouldn't it be nice to skip the warm-up phase and be able to race with pipin' hot gumballs, right from the get-go? With Trinity's* Touring Car Tire Warmers, you can.

The Tire Warmers (part no. RC6076; suggested retail, \$49.95) are like electric blankets that wrap around the tires. Trinity sells 'em in sets of

LIKES

- Makes R/C racing even more realistic.
- Fuse protected—just in case.
- High-quality construction ...

DISLIKES

- ... but the price seems a little steep.

two pairs, and each pair is powered by a 6-cell pack or a power supply (not included; just connect the supplied alligator clips to whichever source of juice you prefer).

The nylon warmers are secured by hook-and-loop fasteners and feature an in-line fuse, in case something goes awry. Their overall construction is very nice; Trinity did it right.

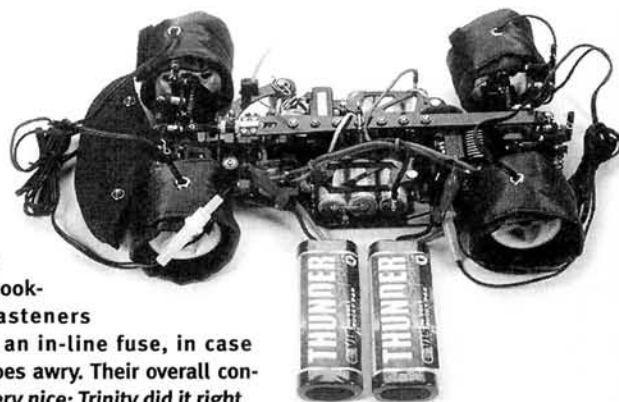
I tested the warmers with power from a 12V, 15A power supply; the warmers pull only about 1.5 amps, so even a 5A supply will work fine. It took only 3 minutes for the Tire Warmers to reach 122°F (as measured by an MIP* temperature gauge), and after 20 minutes, they maxed out at a scorching 205°F. I popped the warmers off my sedan, and the tires were actually uncomfortable to hold—now, that's hot!

I also tested the warmers with power from a 6-cell pack (one pack for each pair of warmers), and it heated up the tires to a balmy 105°F. This felt slightly warmer than the temp my tires usually reach after a 5-minute heat on asphalt, so the warmers were definitely getting enough heat into the rubber. With battery power, the car can be carried to the start line with warmers in place, ensuring hot treads right up 'til the start tone.

Trinity's Tire Warmers are wide enough to fit pan-car foams and can be used to speed the drying of traction compound. Capped tires can also benefit greatly from prerace warming. And every car looks trick with the purple warmers wrapped around the tires; you'll look like a serious racer with these bad boys on your pit bench, and that psych-out factor can be a real plus!

—Peter Vieira

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■



PHOTOS BY WALTER SIDAS

Team ORION MOTOR TECH

with Oscar Jansen

PART ONE Introduction

A lot has changed in the world of electric motor technology since I bought my first R/C car back in 1978; the complexity, tunability and power of today's motors far outstrips the best motors of yesteryear. However, many "secrets" still exist for achieving ultimate performance. In the following series of articles, I will explain the basic principles of motor tuning and reveal some of the steps we follow at Team Orion to build the fastest motors possible

Let's start with the basics: what is an electric motor, and how does it turn electricity into motion? In simplest terms, the typical electric motor in R/C is a combination of a steel can with 2 ceramic magnets; one with a positive charge, and the other negatively charged. A 3-pole armature (the part that actually spins) is held between the magnets by bearings or bushings in the can and endbell (the plastic or alloy cap on the end of the motor). The armature is wrapped with wire, and the wires are attached to the commutator (the copper "barrel" at the top of the armature). The endbell holds the "brushes" against the commutator to transfer electricity into it. Fitted together with the right tolerances and an electric power source, all these parts make the motor work.

For an electric R/C car, that power source is the combination of charger, battery and speed control. A bad charger that doesn't charge your battery properly will make your motor feel very slow. Get a high-quality, delta peak charger with a minimum charge rate of 3 amps; your local hobby shop can help. Next, we turn our attention to the batteries.

In racing, it is very important to buy a "matched" pack; one that uses cells chosen for their identical performance attributes. Assembled into one pack, the matched cells deliver more power and run time than "sport" packs that are made of randomly selected cells. Sanyo RC2000 cells offer the most capacity, and with the additional V-Max plus voltage-increasing process used by Team Orion, the voltage will be very high, compared to your competitors' packs. A high-voltage battery will make your motor a lot faster and more efficient, because with higher voltage, the motor wastes less energy as heat.

The final link in the power chain is the speed control; it controls the flow of energy from the battery to the motor. The use of an electronic speed control (ESC) is an absolute necessity for any type of racing, as this will provide the smoothest control.

That leaves the motor; you must make many important decisions before you choose the correct powerplant for your car. We'll begin tackling the issues of winds, turns, brushes and more in the next installment. Until then!

KYOSHO F-TEN SPORTS PROTO

(Continued from page 74)

PERFORMANCE

After using a few tanks of fuel to break in the engine and check my trims, I headed down to the local parking lot to see what the F-Ten chassis could do.

I turned on the radio system, installed the plug igniter and yanked the pull-starter a couple of times. As simple as that, the engine was running. I gave it a minute to warm up, then I yanked the trigger; the car took off without as much as a hiccup. Kyosho's fixed, low-speed needle was spot on.

After a few full-throttle passes, I leaned out the high-speed needle a tick to get max rpm. Once again, I tugged the throttle, and the car accelerated strongly to a healthy top speed.

How was handling? Exciting. Thanks to the wider than usual tires and four-wheel drive, I could find traction anywhere. Instead of slowing down for a turn, I tapped the brake, cut the wheel, got back on the gas and watched the rear wheels slide around the apex and straighten out on exit—not exactly easy on the tires but man, is it fun! Although 4WD might seem unusual for the World

Sports Car and Formula 1 bodies the F-Ten is available with, the all-wheel-drive system allows you like full-scale 2WD racers—tail out! Even if 4WD isn't scale for these cars, it looks scale when they're being driven.

Average run times of 15 minutes kept the fun alive between fill-ups. Tank after tank, the car ran virtually trouble-free; I did manage to pop the center belt off a couple of times, but that was probably due more to my abusive driving style than to anything else. The plastic brake disk held up well, despite my concerns. Just be sure the calipers aren't dragging on the disk when the throttle is on, and you shouldn't have any troubles.

FINAL THOUGHTS

I really like the F-Ten. Its excellent quality and instructions make it a pleasure to build and maintain. Though it isn't designed to be a "true" racecar, it performs exceptionally well (if anybody wants to start a racing class for these, I'm in).

If you're looking to get a hot new gas car that's easy to drive and looks scale inside and out, I would say you've found it in the Kyosho Sports Proto and Formula Ten.

*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■

HPI RS4 MT

(Continued from page 90)

PERFORMANCE

Ah, the easy and fun part of any "Thrash Test." No long haul to the track for this truck; just a trip across the street to the schoolyard for some multi-terrain mayhem. First, the pavement test. From my experience with off-road trucks on blacktop, I expected the usual one-wheel-in-the-air cornering action from the long-legged MT, but it kept all four meatballs on terra firma. There was a little understeer at high speed, but it was easy to get off the gas, cut the wheel and pitch the car sideways like a sprinter. Just don't overcook it, or the MT will perform a 4WD pirouette (which is entertaining in its own right).

After burning off a couple of packs, I pulled the interior shell off to see how the electrics were holding up. It was like opening up a gas grill to check on the burgers—I'm talkin' heat! There's almost no ventilation under the interior shell, the stock gear ratio is on the tall side for the 11-turn motor, and the MT has a lot of traction and is fairly heavy. Combine all these with a high-capacity battery, and it's no wonder the electrics got hot.

After a little cool-down time, I was back on the gas. This time around, I decided to go for a little trials-type action. There's a nearly vertical grass embankment on the far side of the schoolyard that reaches about 15 feet up to the school itself; it's like climbing stairs! I really didn't expect the MT to climb this obstacle; with those smooth, flat-top tires, how could it? I parked the truck at the

foot of the embankment and pegged it. Much to my surprise, the MT cleaned it with ease and reared up on its back wheels in a victory wheelie at the top! I was duly impressed.

I was curious to see what the MT would do in the dirt, so I made the trip to a local track. I took along a set of Pro-Line* Gladiator tires, but I tried the stock treads first. Not surprisingly, they didn't provide tons of traction, although the car was a lot of fun to drive nonetheless! Have you ever seen sprint cars run? That's how the MT handled: steer with the throttle, rear end out all the way.

For a more precise driving style, I glued up the Gladiators and went out again. Now the MT felt as if it were on rails: just point and shoot. It jumped well, too, and was rock-stable in the air thanks to the gyroscopic action of the big tires. I found a few monster-truck-type roots and rocks to challenge the MT, which took to them with aplomb. As long as the MT didn't high-center, it cruised right through.

FINAL THOUGHTS

HPI has a winner here. It has combined the rugged appeal of a truck with the easy driving manner of a 4WD to create an all-new type of vehicle that's at home on any terrain. It's just a ton of fun to drive—a laugh-out-loud, "Did you see that? Do it again!" type of thing. It looks great, goes anywhere, is easy to build and doesn't ask for a lot of maintenance—just let it cool off between runs!

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The boys at work for you

The question on most nitro engine owners' minds is: when will I need to rebuild my nitro engine, and how will I do it? If you have noticed a loss in power or rough idling, or you've had an engine stall as it returns to idle, or tuning has become increasingly difficult, your engine is due for a rebuild.

Your engine is also probably due for a rebuild if you have taped up the cooling fins, leaned it out till it's screaming and poured sand and diet cola into the venturi till the engine came to a sudden, grinding halt. Have you

guys ever done that? Well, have ya?? I hope not, but we did; we did it under the guise of having to show you what a destroyed engine looks like. But, actually, I think we enjoyed the process just a little too much (especially Steve Pond).



During the experiment, I learned many things: Peter Vieira blinks his eyes at a rate of 48 beats per second when sand is being poured into the venturi of an engine that's screaming at 20,000rpm;

Greg Vogel laughs like Dracula's sidekick, Renfield, when Pepsi is poured into the venturi of an engine screaming at 20,000rpm; Steve Pond is a totally metallurgic Marquis de Sade; and Thunder Tiger engines are incredibly tough to break! It took us nearly an hour to torture a Pro .12 to death with this—highly *not* recommended—treatment; truly a statement about the Thunder Tiger's durability.



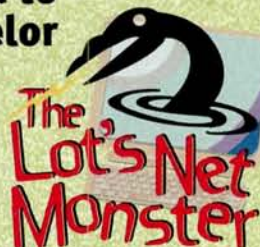
What's the point of telling you all this? No point; except that it shows that the staff of *Car Action* is every bit as whacked out as some of you readers. I thought you should know!!

You should also know that in the next issue, you'll be able to read Brian Leslie's "How to Rebuild a .12-size Nitro Engine." We'll be the first to follow his advice!



From gas guru to family counselor

Ask Chris!
Dear Abby ...
er ... Chris!



7/2/98, 9:27 a.m.

To: Chris Chianelli [email]

Hi.

First of all, GREAT magazine! I love R/C cars, and I currently have two (an HPI Nitro Mini and a Tamiya FWD). I am planning to buy a Dave Jun Edition Tamiya to race, but, well, my problem is that my mom obviously regrets that I am into this hobby. What should I tell her to make her have a better vision of this hobby? She does not like R/C cars (I can understand that), and even if I have the money, she won't let me purchase the DJ Edition car—even if I have ALL the \$259.99 for it. Please help! —Dave

How old are you, Dave? —Chris

12. I got my first car when I was 11 (the Tamiya FWD). —Dave

Dave, R/C cars are very positive and creative things to be into. These days, some kids your age are getting into trouble with things like drugs. You're obviously a good kid. Has your mom already bought you a few cars? Are you being greedy? Be honest.

Chris, no; I earn money by shoveling snow and raking leaves! Then I buy these cars, but my mom never took part in this hobby! I don't expect her to like the hobby—heck, she is a woman! But I at least don't want her to regret that I am into it! Ya know what I mean?!? And she never bought even a body clip for my R/C cars

Dave, I want you to tell your mom that I've been encouraged to build models all my life. As a result, I have this great job as a senior editor in a publishing company, and because of the R/C hobby, I have literally traveled the world. Model building is very positive. Better yet, let me talk to your mom. Get her over to the keyboard!!

Chris, I think she's really PO'd I got you involved.

Later the same day:

Chris, I can't believe it! Believe it or not, it worked! We talked it over and she understands it now! And also, she EVEN paid for the broken body post from my Tamiya! And the fuel bottle from my HPI Nitro Mini (\$9.75 in total). And she says that since my birthday is coming up, IF I can get the \$249.99 for the Tamiya Dave Jun Edition, she will allow me to buy it and even let me race it! Thanks, Chris.

P.S. Can you publish that very first email I sent ya? It would be funny, 'cause I would show my mom! Ya know? Thanks.

Any time, Dave. That's why I'm here ... I think! :)
—Chris